

**DISEASES KNOW NO BOUNDARIES: A CASE FOR FEDERALLY
MANDATED VACCINATIONS**

by
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Abstract

This thesis reviews the recent critical rise in the vaccine-preventable disease, the measles, across the United States and the role of the federal government to protect the public health and safety of its citizens. The first chapter evaluates the legal authority of Congress to remove all non-medical vaccine exemption laws for immunizations that: 1) have been administered to the American public for a minimum of ten years; 2) proven effective; and 3) have little to no side effects. This study finds that Congress does possess the ability to prevent the introduction and spread of infectious diseases. The second chapter discusses the possibility of the President of the United States, through executive order, to create this national immunization standard should Congress be unable to enact such legislation. However, this study finds the threat of militarizing vaccinations precarious and recommends Congress remain as the architect for this standard. The final chapter explores the creation and implementation of monetary vaccination incentives for parents who provide their children with immunizations that have been administered for ten or more years and are proven safe and effective. This thesis concludes with the need to re-establish trust in immunizations among the American people and how the politicization of the impending COVID-19 vaccine threatens that foundation.

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Dedication

To Ana and Jose.

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Introduction

As you are reading this, there are over 2.5 million children in the United States that are at risk of contracting measles.¹ This is not inclusive of the number of Americans who are immunocompromised and thus, medically ineligible to receive the measles, mumps, and rubella (MMR) vaccine to protect themselves and those around them. According to the World Health Organization (WHO), this virus is one of the most contagious diseases in the world.² It is nine times more infectious than Ebola, it spreads through sneezing and coughing, and can remain in the air and on surfaces for up to 2 hours.³ Among other symptoms, its victims can endure fevers, coughs, and a full-body rash. Up to 40 percent of patients will suffer complications such as pneumonia and encephalitis or brain swelling.⁴ Survivors of this disease can be left with destroyed immune systems, deafness, or physiological impairments.⁵ Pneumonia complication is the leading cause of death among young measles patients with almost 1 to 3 out of 1,000 children typically dying from this outcome.⁶ There is no treatment. There is no cure.⁷

The only public defense against this disease is a pre-emptive vaccination.⁸

However, despite this, there has been a significant decline in the administration of the

¹ Magra, Iliana. "Over 20 Million Children a Year Miss Out on First Dose of Measles Vaccine," April 25, 2019. <https://www.nytimes.com/2019/04/25/world/europe/children-measles-vaccine.html>.

² "Measles." World Health Organization. World Health Organization, December 5, 2019. <https://www.who.int/news-room/fact-sheets/detail/measles>.

³ Brodwin, Erin. "Here's How Much More Contagious Measles Is than Ebola." Business Insider. Business Insider, February 2, 2015. <https://www.businessinsider.com/how-much-more-contagious-is-measles-than-ebola-2015-2>; "Measles." World Health Organization.

⁴ Belluz, Julia. "8 Things Everybody Should Know about Measles." Vox. Vox, January 29, 2019. <https://www.vox.com/2019/1/29/18201982/measles-outbreak-virus-vaccine-symptoms>.

⁵ Gallagher, James. "Measles Makes Body 'Forget' How to Fight Infection." BBC News. BBC, October 31, 2019. <https://www.bbc.com/news/health-50251259>; "Measles Complications." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, June 13, 2019. <https://www.cdc.gov/measles/symptoms/complications.html>.

⁶ "Measles Complications." Centers for Disease Control and Prevention.

⁷ "Measles." World Health Organization.

⁸ Ibid.

MMR vaccine primarily due to the rise of vaccine-hesitant and resistant households across the country.

In the face of public health threats and a lack of state action, the federal government has risen to meet certain challenges throughout American history. From the passage of the Act for the Relief of Sick and Disabled Seamen in 1798 to helping expand access to life-saving vaccines through the Vaccine Assistance Act in 1962 and later the Vaccine for Children Program in 1994, the federal government has shown a duty of care to ensure the public health and safety of its citizens.⁹ To that end, if the states are unable to create laws to protect their residents from vaccine-preventable diseases, then Congress should take federal action to repeal all non-medical immunization exemptions, such as religious and phisological objections, to protect the nation.

This issue has a heightened sense of urgency and relevancy as the United States is currently in the midst of one of the worst global health crises in its history with the COVID-19 pandemic.¹⁰ Apart from the inevitable public health issues, COVID-19 has disrupted all facets of everyday living and normality: temporarily shutting down entire economies and leaving the world at a standstill. Since June 2020, it has caused over 44 million Americans to file for unemployment assistance.¹¹ It has also caused schools to

⁹ Public Health in the United States. Boston University School of Public Health, n.d. <https://sphweb.bumc.bu.edu/otlt/mph-modules/ph/publichealthhistory/publichealthhistory8.html>; Simmons-Duffin, Selena. "The Other Reasons Kids Aren't Getting Vaccinations: Poverty And Health Care Access." *NPR*. May 20, 2019. <https://www.npr.org/sections/health-shots/2019/05/20/724468630/the-other-reasons-kids-arent-getting-vaccinations-poverty-and-health-care-access>; Hendriks, Jan, and Stuart Blume. "Measles Vaccination before the Measles-Mumps-Rubella Vaccine." *American journal of public health*. American Public Health Association, August 2013. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4007870/>.

¹⁰ Solender, Andrew. "CDC Director Says U.S. Government Was 'Underprepared' For Coronavirus Pandemic." *Forbes*. Forbes Magazine, August 13, 2020. <https://www.forbes.com/sites/andrewsolender/2020/08/13/cdc-director-says-us-government-was-underprepared-for-coronavirus-pandemic/>.

¹¹ Lambert, Lance. "Over 44.2 Million Americans Have Filed for Unemployment during the Coronavirus Pandemic." *Fortune*. Fortune, June 11, 2020. <https://fortune.com/2020/06/11/us-unemployment-rate-numbers-claims-this-week-total-job-losses-june-11-2020-benefits-claims/>.

abruptly move to online learning venues, students to miss milestone events such as graduations, and parents to struggle between homeschooling and working virtually with no clear end. The value of public health in our communities cannot be overlooked and the grave impact of a single virus cannot be underestimated.

This thesis will discuss the public health implications of the decline in vaccine rates, and in particular, the MMR vaccine, in the United States and explore the legal actions available to Congress and the President to reverse this trend to ensure the health and safety of the American people. This will be accomplished by first reviewing the history of disease prevention and control in the United States followed by an in-depth discussion of the legal authority of the states and federal governments have with regard to public health and safety. Recommendations that could help mitigate the resulting public health threats being faced as a society will be proposed. These proposals will be evaluated and include the implementation of programs, such as monetary immunization incentives, which would help to increase vaccination rates and, in turn, increase herd immunity among vulnerable populations.

Topic Relevancy

Prior to the invention of the first measles vaccine in 1963, it is estimated that this disease killed 2.6 million people every year around the world.¹² In the United States alone, up to 4 million people per year would be diagnosed with the measles, with almost

¹² “Measles.” World Health Organization. World Health Organization.

every child contracting it before the age of 15.¹³ In addition, it is estimated that major outbreaks occurred almost every 2 to 3 years.¹⁴

Although the first measles vaccine was developed in 1963, the vaccine formula still used today was created in 1968. The cost then of the vaccine was \$10 (or \$82 today) per dose.¹⁵ This high cost for many, particularly among lower-income communities, led to apparent disparities in its coverage.¹⁶

In recognition of these financial hardships for many and the unique ability vaccines have in protecting the public against deadly diseases, the federal government created the Vaccine Assistance Act of 1962 to help states distribute immunizations for whooping cough, tetanus, polio, and eventually, measles. In the first three years of including the measles vaccine this program, 15 million children were immunized against this virus and the number of reported cases dropped by 50 percent.¹⁷

As the number of cases steadily declined, in 1967 the federal government launched a national campaign to eliminate measles as a public health problem in the United States.¹⁸ Eventually, every state in the country established vaccination requirements for school enrollment which, in turn, increases the immunization threshold among students.¹⁹ Using these concerted and consistent efforts, the United States was

¹³ "Measles | History of Measles | CDC." Centers for Disease Control and Prevention. February 5, 2018. <https://www.cdc.gov/measles/about/history.html>

¹⁴ "Measles." World Health Organization.

¹⁵ Waldstein, David. "Vaccinations Fall to Alarming Rates, C.D.C. Study Shows." The New York Times. The New York Times, May 18, 2020. <https://www.nytimes.com/2020/05/18/health/vaccinations-rates-coronavirus.html>.

¹⁶ Hendriks, Jan, and Stuart Blume. "Measles Vaccination before the Measles-Mumps-Rubella Vaccine."

¹⁷ Ibid.

¹⁸ Ibid.

¹⁹ Salmon, Daniel A, Stephen P Teret, C Raina MacIntyre, David Salisbury, Margaret A Burgess, and Neal A Halsey. "Compulsory Vaccination and Conscientious or Philosophical Exemptions: Past, Present, and Future." The Lancet. Elsevier, February 2, 2006. <https://www.sciencedirect.com/science/article/pii/S0140673606681440>.

able to go from 3 to 4 million cases per year, to only 86 by 2000, thus reaching elimination status for the disease.²⁰

However, as a result of this success, states began allowing parents to cite non-medical exemptions to circumvent these vaccine requirements. These exemptions inevitably contributed to the regression of the number of individuals immunized against measles as part of the ongoing anti-vaccination trend in Western countries such as the United States, the United Kingdom, and France.²¹

The contemporary anti-vaccination movement can be traced back to the 1998 publication of a medical study by Andrew Wakefield and colleagues, which alleged a connection between the MMR vaccine and children developing autism. However, this study was scientifically rebuked and later retracted in 2010 after Wakefield and his team were accused of fraud for having presented specific data that was driven by financial interests and violated ethical rules.²²

Nonetheless, prior to retraction, this study had circulated around the world for more than a decade causing untold damage. In fact, its disproven claims continue to be cited today by vaccine-hesitant and resistant groups and notable public figures such as Robert F. Kennedy Jr., Robert De Niro, and Jenny McCarthy.²³ As a result, parents understandably began questioning the safety of the MMR vaccine. Thus, fueling the rise of the contemporary anti-vaccination movement.

²⁰ Howard, Jacqueline. "US Measles Outbreak Is Largest since Disease Was Declared Eliminated in 2000." CNN. Cable News Network, April 25, 2019. <https://www.cnn.com/2019/04/24/health/measles-outbreak-record-us-bn/index.html>.

²¹ Hussain, Azhar, Syed Ali, Madiha Ahmed, and Sheharyar Hussain. "The anti-vaccination movement: a regression in modern medicine." *Cureus* 10, no. 7 (2018).

²² Rao, T. S., & Andrade, C. (2011). The MMR vaccine and autism: Sensation, refutation, retraction, and fraud. *Indian journal of psychiatry*, 53(2), 95–96. doi:10.4103/0019-5545.82529

²³ Roberts, Karin. "When It Comes to Vaccines, Celebrities Often Call the Shots." NBCNews.com. NBCUniversal News Group, October 29, 2018. <https://www.nbcnews.com/health/health-care/when-it-comes-vaccines-celebrities-often-call-shots-n925156>.

The anti-vaccination sentiment is also observed in religious communities such as the Amish in Ohio, Somalis in Minnesota, and ultra-Orthodox Jews in New York.²⁴ The religious objections are due to the belief that vaccines obstruct God's will, they "could violate religious dietary laws, unless they are designated kosher or halal," and could be potentially created with the use of aborted cells.²⁵ Many insular Orthodox Jewish communities have also been targeted by anti-vaccination groups, such as Parents Educating and Advocating for Children's Health (PEACH) who have dispensed 40-page disinformation booklets in New York and New Jersey.²⁶

These groups use excerpts from the Torah to manipulate the legitimacy of the myths regarding the alleged dangers of immunizations.²⁷ To counter these groups, Rabbis, medical professionals, the Rabbinical Council of America, and The Orthodox Union have created public health campaigns in support of vaccinations.²⁸ However, these counter-campaigns face a significant challenge as Dr. Sean O'Leary, a pediatric infectious disease specialist at the University of Colorado School of Medicine who researches vaccine hesitancy, notes how simple it is "to plant fear into people's minds, but it's much harder to get that fear out of their minds."²⁹

With the achievement of herd immunity through the use of vaccines, the United States was able to claim elimination statuses for polio, rubella, and measles diseases.

²⁴ Belluz, Julia. "New York's Orthodox Jewish Community Is Battling Measles Outbreaks. Vaccine Deniers Are to Blame." Vox. Vox, November 9, 2018. <https://www.vox.com/science-and-health/2018/11/9/18068036/measles-new-york-orthodox-jewish-community-vaccines>.

²⁵ Dias, Elizabeth. "Measles Outbreak: What Are Religious Exemptions for Vaccinations?" The New York Times. The New York Times, March 27, 2019. <https://www.nytimes.com/2019/03/27/us/measles-vaccine-exemptions.html>.

²⁶ LaMotte, Sandee. "Why New York Hasn't Contained the Largest and Longest Measles Outbreak in Decades." CNN. Cable News Network, March 29, 2019. <https://www.cnn.com/2019/03/29/health/measles-ny-outbreak-fear-misinformation/index.html>.

²⁷ Ibid.

²⁸ Dias, Elizabeth. "Measles Outbreak: What Are Religious Exemptions for Vaccinations?"

²⁹ LaMotte, Sandee. "Why New York Hasn't Contained the Largest and Longest Measles Outbreak in Decades."

Nonetheless, these diseases still exist within the nation's borders.³⁰ And in order to retain elimination status, herd immunity is still required, but it is in jeopardy. Between 2009 and 2018, a decline in MMR vaccine administrations has been observed in 26 states and this led to increases in measles outbreaks, with the most recent outbreak in 2019.³¹

In the first five months of 2019, there were more confirmed cases of measles in the United States than the total reported in the last 25 years of this nation's history.³² By the end of that year, there were over 1,200 cases of measles in 31 states.³³ As such, the United States almost lost its measles elimination status and thus narrowly missed joining the ranks of the United Kingdom, Greece, Albania, and the Czech Republic where the revocation of this declaration was ultimately unavoidable.³⁴

New York, as a result of being the epicenter of the country's 2019 measles outbreak, became the fifth state to remove religious exemptions to its vaccination laws alongside Mississippi, Maine, California, and West Virginia.³⁵ Although the impact of such stringent laws on the First Amendment of the United States Constitution may cause concern, in 1944, the Supreme Court ruled that religious liberties "does not include

³⁰ Praderio, Caroline. "4 Diseases That Have Been Eliminated in the United States in the Last 100 Years." Insider. Insider, January 25, 2019. <https://www.insider.com/diseases-eliminated-united-states-vaccines-2019-1>.

³¹ Pilkington, Ed. "US States Saw Drop in Vaccine Rates for Children as Anti-Vaxx Theories Spread." The Guardian. Guardian News and Media, November 16, 2019. <https://www.theguardian.com/us-news/2019/nov/16/vaccines-measles-mumps-polio-hepatitis-b>.

³² "U.S. Measles Cases in First Five Months of 2019 Surpass Total Cases per Year for Past 25 Years." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, May 30, 2019. <https://www.cdc.gov/media/releases/2019/p0530-us-measles-2019.html>.

³³ "Measles Cases and Outbreaks." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, August 19, 2020. <https://www.cdc.gov/measles/cases-outbreaks.html>.

³⁴ Blakemore, Erin. "WHO Measles Statistics: These Five Countries Have the Most Cases, but the U.S. Is Struggling with the Disease, Too." The Washington Post. WP Company, December 16, 2019. https://www.washingtonpost.com/health/who-measles-statistics-these-five-countries-have-the-most-cases-but-the-us-is-struggling-with-the-disease-too/2019/12/13/79835d2a-1c5a-11ea-b4c1-fd0d91b60d9e_story.html.

³⁵ Rosenberg, Eli. "New York, Epicenter of Measles Outbreak, Bans Religious Exemptions for Vaccines." The Washington Post. WP Company, June 14, 2019. <https://www.washingtonpost.com/health/2019/06/14/new-york-epicenter-measles-outbreak-bans-religious-exemptions-vaccines/>.

liberty to expose the community or the child to communicable disease or the latter to ill health or death.”³⁶

There are states, such as Iowa, Minnesota, Washington, Arizona, and Vermont who have tried to introduce bills to remove philosophical or religious exemptions. However, these efforts have not been successful as 45 states continue to allow for non-medical vaccine exemptions.³⁷ This is a deadly public health crisis in the making that can lead to a national security threat where the American public is vulnerable to bioterrorist attacks.

This Study

In an effort to protect the country from vaccine-preventable diseases, the first section of this study will review the legal authority Congress has to repeal non-medical exemptions for immunizations which meet the following criteria: 1) must have been administered to the American public for a minimum of ten years; 2) proven effective; and 3) have little to no side effects. This review includes the examination of the Public Health Service Act of 1944, which states that the state the federal government may interject in public health emergencies “to prevent the introduction, transmission, or spread of communicable disease” between states and those imported from international sources such as the recent 2019 measles outbreaks.³⁸ In that case, Congress would have legal

³⁶ *Prince v. Massachusetts*, 321 U.S. 158 (1944).

³⁷ Sun, Lena H. “Anti-Vaxxers Face Backlash as Measles Cases Surge.” The Washington Post. WP Company, February 26, 2019. https://www.washingtonpost.com/national/health-science/anti-vaxxers-face-backlash-as-measles-cases-surge/2019/02/25/e2e986c6-391c-11e9-a06c-3ec8ed509d15_story.html.

³⁸ Romo and Neighmond, "Washington State Officials Declare State Of Emergency As Measles Outbreak Continues." *NPR*. January 29, 2019. <https://www.npr.org/2019/01/28/689549375/washington-state-officials-declare-state-of-emergency-as-measles-outbreak-contin>

grounds to establish such a statute as the measles outbreak was introduced from unvaccinated travelers returning home and then spread throughout the states.

It was also found that another reason children are not being administered vaccinations in the United States is due to poverty and the lack of consistent access to healthcare.³⁹ To that end, it is recommended that Congress further evaluates the country's healthcare system with a focus on structural disparities and that it expands health measures, such as the Vaccines for Children program, to ensure children in lower socio-economic households have access to these life-saving immunizations, and in turn, will contribute to maintaining herd immunity.

The second section will review the legal authority of the President through executive order to enact measures to protect the country from vaccine-preventable diseases in the event Congress is not able. There is precedent for such an outcome as prior Presidents have issued executive orders pertaining to public health such as "Advancing the Global Health Agenda to Achieve a World Safe and Secure from Infectious Disease Threats."⁴⁰ This prospect was discussed in the second study as there are diseases, such as measles, which can pose a national security threat. Further, if infectious diseases were deemed an official national security threat, it would allow for increased funding to minimize those risks. The expansion, for instance, of the Vaccines for Children program could thus be achieved. However, it may also result in unintended adverse consequences like the militarization of vaccine administrations.

³⁹ Simmons-Duffin, Selena. "The Other Reasons Kids Aren't Getting Vaccinations: Poverty And Health Care Access."

⁴⁰ "Executive Order -- Advancing the Global Health Security Agenda to Achieve a World Safe and Secure from Infectious Disease Threats." National Archives and Records Administration. November 4, 2016. <https://obamawhitehouse.archives.gov/the-press-office/2016/11/04/executive-order-advancing-global-health-security-agenda-achieve-world>.

Therefore, in an effort to achieve balance yet create the most impact, it is recommended the President adopt a two-prong approach: 1) work with internet companies to combat disinformation while promoting public health education campaigns, particularly around the MMR vaccine; and 2) work with both public health experts and Congress to create legislation to combat the nation's decaying vaccination rates.

The third section of this thesis will examine alternative measures to protect the country from vaccine-preventable diseases in the event neither Congress nor the President can ultimately repeal non-medical vaccination exemptions. One such alternative is to propose the implementation of monetary vaccine incentives for immunizations that have been around for ten years or more, have been proven effective, and have little to no adverse effects. In 1997, Australia enacted a similar program and as a result, vaccine coverage increased from 75 percent that year to 94 percent by 2001.⁴¹ This monetary incentive can be in the form of direct payments or tax credits and may help encourage parents with limited time capacity, especially those of lower-income households, to schedule their child's wellness visits to ensure they keep up with their immunizations and in particular the MMR vaccine.

The United States government should also join forces with the private sector to expand access to medical facilities and clinics. Incentives to increase the number of doctors who participate in Vaccines for Children and similar programs must also be addressed. Although these initiatives will not directly combat vaccine resistance, it can create a healthcare infrastructure that helps reduce vaccine hesitancy.

⁴¹ Lawrence, Glenda L., C.Raina MacIntyre, Brynley P. Hull, and Peter B. McIntyre. "Effectiveness of the Linkage of Child Care and Maternity Payments to Childhood Immunisation." *Vaccine*. Elsevier, December 12, 2003. <https://www.sciencedirect.com/science/article/pii/S0264410X03008363>.

The government could also sponsor and help implement national public health education campaigns around this issue. It is largely found that a majority of parents only want to know whether their doctor recommends the MMR vaccine.⁴² As such, public health campaigns should be created in collaboration with medical professionals. Doctors could endorse the importance of immunizations while stressing their safety and highlighting the concerns such as the detrimental effects the measles virus can cause to an unvaccinated child. To maintain ongoing interest, doctors could receive monetary incentives for administering vaccines.⁴³

These alternative measures cannot replace the effectiveness of legislative action by Congress and may not help combat disinformation shared by vaccine-resistant communities. However, its presence will help more than its absence, as the goal of this measure is to leverage existing resources to create the most impact to save lives, protect healthcare systems, and to minimize national security threats.

⁴² Scutti, Susan. "How Countries around the World Try to Encourage Vaccination." CNN. Cable News Network, January 2, 2018. <https://www.cnn.com/2017/06/06/health/vaccine-uptake-incentives/index.html>.

⁴³ Ibid.

Chapter One: The use of congressional power to remove all non-medical vaccine exemptions

Introduction

Prior to the 1960s, it was estimated that between 3 to 4 million people in the United States would be diagnosed annually with the measles, a psychologically impairing and potentially deadly virus.⁴⁴ Measles is an airborne disease caused by the rubeola virus, which has the capacity to live up to two hours in the airspace of an infected individual after coughing or sneezing and has up to a 90 percent contraction rate.⁴⁵ The World Health Organization (WHO) has deemed it as one of the most contagious diseases in the world.⁴⁶

In 1963, the first measles vaccine was developed and in 1968, the measles strain still used to this day was discovered. This strain is more commonly placed with mumps and rubella, and collectively, they create the MMR vaccine. This vaccine has been used nationwide and is proven to be highly effective as by the year 2000, the measles was declared eliminated as a public health problem in the United States.⁴⁷ This achievement could largely be accredited to the introduction of school immunization requirements by local and state public health officials, which quickly resulted in the control of several outbreaks. By the early 1980s, every state had adopted their own school immunization requirements.⁴⁸

⁴⁴ "Measles | History of Measles | CDC." Centers for Disease Control and Prevention.

⁴⁵ "Measles | Transmission | CDC." Centers for Disease Control and Prevention. February 5, 2018. <https://www.cdc.gov/measles/transmission.html>.

⁴⁶ "Measles." World Health Organization.

⁴⁷ "Measles | History of Measles | CDC." Centers for Disease Control and Prevention.

⁴⁸ Omer, Saad B., Daniel A. Salmon, Walter A. Orenstein, Patricia DeHart, and Neal Halsey. "Vaccine Refusal, Mandatory Immunization, and the Risks of Vaccine-Preventable Diseases." *The New England*

However, this progress has been effectively reversed as the United States was in the midst of battling its largest measles outbreak in 25 years.⁴⁹ Between January and June 2019, there have been over 1,000 confirmed measles cases reported across 23 states.⁵⁰ This is due to the significant decline in immunization rates throughout the country and in Europe. The genesis of this decline can be traced to the 1998 publication of a medical study conducted by former physician Andrew Wakefield.⁵¹

The Wakefield study alleged that the MMR vaccine increased the predisposition of developmental disorders, such as autism, amongst children. Although this study was eventually redacted and its conclusions scientifically rebuked, it had been globally circulated for 12 years.⁵² As a result, concerned parents increasingly began to refuse the MMR vaccine for their children and the 95 percent immunization rate threshold required to protect communities through herd immunity has declined.⁵³ The cumulative effects of

Journal of Medicine. May 7, 2009. <https://www-nejm.org.proxy1.library.jhu.edu/doi/full/10.1056/NEJMsa0806477>.

⁴⁹ Cai, Weiyi, Denise Lu, and Scott Reinhard. "Largest U.S. Measles Outbreak in 25 Years Surpasses 800 Cases." *The New York Times*. April 30, 2019. <https://www.nytimes.com/interactive/2019/health/measles-outbreak.html>.

⁵⁰ Blint-Welsh, Tyler. "New York Ends Religious Exemptions for School Vaccinations." *The Wall Street Journal*. June 13, 2019. <https://www.wsj.com/articles/new-york-ends-religious-exemptions-for-school-vaccinations-11560467427?ns=prod/accounts-wsj>; Cai, et. al., "Largest U.S. Measles Outbreak in 25 Years Surpasses 800 Cases."

⁵¹ Hussain, Azhar, Syed Ali, Madiha Ahmed, and Sheharyar Hussain. "The anti-vaccination movement: a regression in modern medicine."

⁵² Rao, T. S Sathyanarayana, and Chittaranjan Andrade. "The MMR Vaccine and Autism: Sensation, Refutation, Retraction, and Fraud." *Indian Journal of Psychiatry*. April 2011. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3136032/>; and Garces, Catherine. "The Anti-Vaccination Movement: The Use of Targeted Government Messaging to Mitigate a Public Health Crisis." Essay, Johns Hopkins University, 2019.

⁵³ Rao, T. S Sathyanarayana, and Chittaranjan Andrade. "The MMR Vaccine and Autism: Sensation, Refutation, Retraction, and Fraud;" Andre, FE, R. Booy, HL Bock, J. Clemens, SK Datta, TJ John, RW Lee, S. Lolekha, H. Peltola, TA Ruff, M. Santosham, and HJ Schmitt. "Vaccination Greatly Reduces Disease, Disability, Death and Inequity Worldwide." World Health Organization. March 04, 2011. <https://www.who.int/bulletin/volumes/86/2/07-040089/en/>.

this issue has led the WHO to identify parental vaccine hesitancy to be among the top ten global health threats of 2019, next to Ebola, HIV, and climate change.⁵⁴

Despite the significant increase in measles cases, only 5 states have repealed their non-medical vaccine exemptions such as religious or philosophical objections for school entry: New York, California, Maine, West Virginia, and Mississippi.⁵⁵ These efforts continued to expand as Arizona, Washington, Minnesota, and Iowa tried to remove their exemptions. However, the anti-vaccination sentiment is forceful in these states and has led to the collapse of many bipartisan legislation initiatives.⁵⁶

Although the Supreme Court has recognized the duty of the state to protect public health and declared school immunization requirements to be constitutional, the failure of a number of states to repeal all non-medical vaccination exemptions is a threat to the country and to the international community.⁵⁷ For eight days, an individual with the measles is considered highly contagious and can infect those who are either “too young to be vaccinated, cannot be vaccinated for medical reasons, or were vaccinated but did not have a sufficient immunologic response.”⁵⁸ Since diseases do not recognize state borders, it is the responsibility of the federal government to establish and enforce compulsory

⁵⁴ "Ten Health Issues WHO Will Tackle This Year." World Health Organization. 2019. <https://www.who.int/emergencies/ten-threats-to-global-health-in-2019>.

⁵⁵ Pager, Tyler, and Jeffery C. Mays. "New York Declares Measles Emergency, Requiring Vaccinations in Parts of Brooklyn." *The New York Times*. April 09, 2019. <https://www.nytimes.com/2019/04/09/nyregion/measles-vaccination-williamsburg.html>; Blint-Welsh, "New York Ends Religious Exemptions for School Vaccinations."

⁵⁶ Sun, Lena H. 2019a. "Anti-vaxxers Face Backlash as Measles Cases Surge." *The Washington Post*. February 25, 2019. https://www.washingtonpost.com/national/health-science/anti-vaxxers-face-backlash-as-measles-cases-surge/2019/02/25/e2e986c6-391c-11e9-a06c3ec8ed509d15_story.html?utm_term=.09350edcfe8d; and Garces, "The Anti-Vaccination Movement: The Use of Targeted Government Messaging to Mitigate a Public Health Crisis."

⁵⁷ *Jacobson v. Massachusetts*, 197 U.S. 11, 25 S. Ct. 358, 49 L. Ed. 643 (1905); Brandeis, Louis Dembitz, and Supreme Court Of The United States. U.S. Reports: *Zucht v. King* 260 U.S. 174. 1922. Periodical. <https://www.loc.gov/item/usrep260174/>.

⁵⁸ "Measles | Transmission | CDC." Centers for Disease Control and Prevention; Omer et. al., "Vaccine Refusal, Mandatory Immunization, and the Risks of Vaccine-Preventable Diseases."

immunizations against highly contagious vaccine-preventable diseases in order to protect the public health and security of its citizens.

History of Mandatory Vaccinations

At the beginning of the 20th century, Massachusetts was experiencing a smallpox outbreak with over 1,500 confirmed cases of infection and 270 deaths.⁵⁹ As a result, in 1902 the Cambridge Board of Health instituted a law requiring its residents to be vaccinated against smallpox. However, Reverend Henning Jacobson refused to be immunized due to vaccine safety concerns and was ultimately fined five dollars for noncompliance.⁶⁰

His case was brought before the Supreme Court in *Jacobson v. Massachusetts* (1905).⁶¹ The Court ultimately upheld the authority of the state to require vaccinations for everyone, including those above the age of twenty-one.⁶² More specifically, according to Supreme Court Justice Harlan, the Constitution allows for “such reasonable regulations...as [it] will protect the public health and the public safety” of its residents. In addition, it recognized the police power of the state to enforce such laws.⁶³ Despite this Court ruling, several populations within the United States continued to refuse

⁵⁹ Gostin, Lawrence O. "Jacobson v Massachusetts at 100 years: Police power and civil liberties in tension." *American Journal of Public Health* 95, no. 4 (2005): 576-581.

⁶⁰ Padian, N. S., S. C. Shiboski, S. O. Glass, E. Vittinoff, M. F. Shapiro, S. C. Morton, and D. F. McCaffrey. "Individual rights versus the public's health—100 years after *Jacobson v. Massachusetts*." *New England Journal of Medicine* 352, no. 7 (2005): 652-654.

⁶¹ *Jacobson v. Massachusetts*, 197 U.S. 11, 25 S. Ct. 358, 49 L. Ed. 643 (1905).

⁶² Welborn, Angie A. "Mandatory vaccinations: Precedent and current laws." Library of Congress Washington DC Congressional Research Service, 2005.

⁶³ Bayer, Ronald, and Laurence Dupuis. "Tuberculosis, public health, and civil liberties." *Annual Review of Public Health* 16, no. 1 (1995): 307-326.

vaccinations on the grounds of religious and physiological beliefs, enabling isolated instances of smallpox outbreaks until 1949.⁶⁴

The notion that it is the responsibility of the government to protect its citizens from the spread of disease is widely held and according to Marcel Verweij and Hans Houweling, it is its moral obligation as well.⁶⁵ A successful government needs to protect its citizens from both internal and external threats to create an environment where its citizens can thrive. “This is most clear in the case of a large outbreak of a dangerous disease like measles, SARS, or tuberculosis.”⁶⁶ Unlike the AIDS epidemic where the government established voluntary strategies to education and elective testing, airborne diseases such as these call for more coercive measures as they are easily transmittable and pose a greater threat of infection for individuals who are “unaware they are being put at risk or unable to take precautions to protect themselves.”⁶⁷

However, controversy remains around the Supreme Court ruling in *Jacobson* and in the view upholding the government’s role of moral responsibility.⁶⁸ For instance, Philip Cole argues that although the “commonweal” rationale recognizes certain circumstances for which suspending the rights of a smaller population would be necessary to protect the rights of the larger population, its use in *Jacobson v. Massachusetts* was not fully explained.⁶⁹ That is, how was Jacobson specifically endangering the public health? As such, “the commonweal” justification is “potentially

⁶⁴ Willrich, Michael. "How The 'Pox' Epidemic Changed Vaccination Rules." *NPR*. April 05, 2011. <https://www.npr.org/2011/04/05/135121451/how-the-pox-epidemic-changed-vaccination-rules>.

⁶⁵ Verweij, Marcel F., and Hans Houweling. "What is the responsibility of national government with respect to vaccination?." *Vaccine* 32, no. 52 (2014): 7163-7166.

⁶⁶ *Ibid.*

⁶⁷ Bayer et. al., "Tuberculosis, public health, and civil liberties."

⁶⁸ *Jacobson v. Massachusetts*, 197 U.S. 11, 25 S. Ct. 358, 49 L. Ed. 643 (1905).

⁶⁹ Cole, Philip. "The moral bases for public health interventions." *Epidemiology* vol. 6, no. 1 (1995): 78-83; *Jacobson v. Massachusetts*, 197 U.S. 11, 25 S. Ct. 358, 49 L. Ed. 643 (1905).

dangerous and must be used carefully.”⁷⁰ He believes this is particularly important to avoid further complications and illustrates this point by explaining how history has taught that the continued criminalization of certain drugs under this principle “only multiplies the problems created by the drugs themselves.”⁷¹

Nonetheless, this limitation over autonomy was also recognized by philosopher John Stuart Mill. He believed “The only purpose for which power can be rightfully exercised over any member of a civilized community, against his will, is to prevent harm to another. His own good, either physical or moral, is not a sufficient warrant.”⁷² This was evident in the United States, during the 1950s, where between 3 to 4 million people being diagnosed with the measles every year. It was believed that nearly every child across the country contracted the measles before the age of 15, and as such, active measures were needed to significantly reduce this prevalence.⁷³

As the states introduced compulsory immunizations for which the degree of penalties for noncompliance ranged from denying school admission to quarantine, the courts were not compelled to provide a ruling on the constitutionality of physically requiring an individual to receive a vaccine against their own will. If states were to physically require its residents to receive vaccinations, this would have a direct impact on the autonomy of the body of an individual, and could, therefore, be considered unconstitutional.⁷⁴

⁷⁰ Ibid.

⁷¹ Ibid.

⁷² Holtug, Nils. "The Harm Principle." *Ethical Theory and Moral Practice* 5, no. 4 (2002): 357-89. <http://www.jstor.org/stable/27504250>.

⁷³ "Measles | History of Measles | CDC." Centers for Disease Control and Prevention.

⁷⁴ Gostin, "Jacobson v Massachusetts at 100 years: Police power and civil liberties in tension."

This was further exemplified by Justice Harlan when he asserted the methods taken by the state to protect the public health must be out of necessity, proportional to the expected benefit, reasonable, and can not harm the individual of interest. Although requiring an individual to undergo compulsory quarantine may appear contrary to individual liberty, according to the Supreme Court, as long as the temporary housing does not pose a health risk to the patient, then such a measure may be taken in order to minimize the risk to others.⁷⁵

Moreover, due to the circumstances presented in the *Jacobson* case, the Court was also not required to review how the state's protection of public health may have impacted the Equal Protection Clause of the Fourteenth Amendment.⁷⁶ This could primarily be due to the fact the Cambridge Board of Health applied this requirement to virtually all of its residents.⁷⁷

The unconstitutionality of discriminatory practices concerning medical treatment was pre-established in *Jew Ho v. Williamson* (1900) when the San Francisco Board of Health began to quarantine residences due to the supposed outbreak of the bubonic plague.⁷⁸ However, according to *Jew Ho*, the quarantine lines were drawn in such a manner that only Chinese American homeowners were impacted while the members of other races were exempt.⁷⁹ The U.S. Circuit Court for the Northern District of California found this particular quarantine practice to be "unreasonable, unjust, and oppressive, and

⁷⁵ Ibid.

⁷⁶ *Jacobson v. Massachusetts*, 197 U.S. 11, 25 S. Ct. 358, 49 L. Ed. 643 (1905).

⁷⁷ Gostin, "Jacobson v Massachusetts at 100 years: Police power and civil liberties in tension."

¹³ *Jacobson v. Massachusetts*, 197 U.S. 11, 25 S. Ct. 358, 49 L. Ed. 643 (1905).

⁷⁸ *Jew Ho v Williamson*, 103 F 10 (CCND Calif 1900).

⁷⁹ Markey, Ransom, and Sunshine. "Ebola: A Public Health and Legal Perspective." *American Bar Association*. June 27, 2017.

https://www.americanbar.org/groups/health_law/publications/aba_health_esource/2014-2015/january/ebola/.

therefore contrary to the laws limiting the police powers of the state and municipality in such matters[,] that it is discriminating in its character, and is contrary to the provisions of the Fourteenth Amendment of the Constitution of the United States.”⁸⁰ As a result, the court ordered for the quarantine to be discontinued and that future measures may only apply to those who the board of health “had reason to believe were infected by contagious or infectious diseases.”⁸¹

Evolution of School Mandated Vaccinations

In late 1960s, a national campaign was undertaken to promote the eradication of measles.⁸² And by 1969, in response to the high volume of pediatric smallpox cases, local and public health officials in 17 states established vaccination requirements for public school enrollment as a means to significantly increase the immunization threshold among children.⁸³ However, this controversial provision was believed to have violated the Fourteenth Amendment, as some schools, since the early 1900s, were already declining admission to students not immunized against smallpox.⁸⁴

In 1922, Rosalyn Zucht was denied admission to public and private schools in San Antonio, Texas due to the lack of proper vaccine certification. This dispute was ultimately brought to the Supreme Court in *Zucht v. King* (1922).⁸⁵ It was argued that Zucht could not be barred from attending school as her deficit in vaccinations placed her

⁸⁰ Ibid.

⁸¹ Ibid.

⁸² Salmon, Daniel A., Stephen P. Teret, C. Raina MacIntyre, David Salisbury, Margaret A. Burgess, and Neal A. Halsey. "Compulsory vaccination and conscientious or philosophical exemptions: past, present, and future." *The Lancet* 367, no. 9508 (2006): 436-442.

⁸³ Omer et. al., "Vaccine Refusal, Mandatory Immunization, and the Risks of Vaccine-Preventable Diseases."

⁸⁴ Ibid.

⁸⁵ Brandeis, U.S. Reports: *Zucht v. King* 260 U.S. 174.

with a “particular class of individuals” which was protected under the Equal Protection Clause.⁸⁶ Nonetheless, the Court upheld the ability of the state to deny school attendance as “these ordinances confer not arbitrary power, but only that broad discretion required for the protection of the public health.”⁸⁷ This outcome resulted in the control of several outbreaks.⁸⁸

Moreover, in 1977, Joseph Califano, Secretary of the Department of Health and Human Services wrote to every state governor advocating the enforcement of compulsory vaccinations. The Centers for Disease Control and Prevention (CDC) also recommended universal immunization requirements for school admission as they began to purchase these life-saving vaccinations with federal funding. This effort by the federal government was intended to support vaccine infrastructure.⁸⁹ It proved to be effective, as by the early 1980s, every state had adopted their own school immunization requirements.⁹⁰

As each state began to adopt compulsory vaccination laws, with medical exemptions for those allergic to vaccine compositions or immunocompromised. However, state legislatures also began to include non-medical exemptions such as religious and philosophical exemptions. This led states which enacted these non-medical exemptions, between 1991 and 2004, to experience an increase in students who obtained permission to attend school despite not being immunized. According to Richard Hughes,

⁸⁶ Beltz, Laura. "Where Does the Government's Right to Require Vaccinations Come From?" *National Constitution Center*. February 27, 2015. <https://constitutioncenter.org/blog/where-does-the-governments-right-to-require-vaccinations-come-from>.

⁸⁷ Brandeis, U.S. Reports: *Zucht v. King* 260 U.S. 174.

⁸⁸ Omer et. al., "Vaccine Refusal, Mandatory Immunization, and the Risks of Vaccine-Preventable Diseases."

⁸⁹ Salmon, et. al., "Compulsory vaccination and conscientious or philosophical exemptions: past, present, and future."

⁹⁰ Omer et. al., "Vaccine Refusal, Mandatory Immunization, and the Risks of Vaccine-Preventable Diseases."

this was in part due to the 1998 release of Wakefield's misleading paper which influenced many concerned parents to question vaccine safety.⁹¹

However, it also appears the success of vaccinations may have contributed to its downfall. As there were millions of individuals who were frequently affected by the measles in some capacity, either through infection or association with someone who has been infected, the threat of the contamination was prevalent.⁹² Nonetheless, as the rate of incidence began to decline due to the immunization requirements in schools, so did the public's perception of the severity of the measles. Paradoxically, instead of the disease itself, it is now the perceived safety of the vaccine that is under scrutiny and called into question, resulting in the increasing number of individuals who refuse immunization.⁹³

Non-Medical Vaccination Exemptions

The recent decline in MMR vaccinations is particularly prevalent in ultra-religious communities. Since 2014, 88 percent of reported measles cases have come from religious regions such as the Amish in Ohio, Orthodox Jews in New York, Somalis in Minnesota, and groups from Eastern Europe in the Pacific Northwest.⁹⁴ The religious objections range from conflicts with dietary laws, as vaccines may not be considered

⁹¹ Hughes, Richard. "Vaccine Exemptions and The Federal Government's Role." *Health Affairs*. March 21, 2019. <https://www.healthaffairs.org/doi/10.1377/hblog20190318.382995/full/>.

⁹² Pierce, William. "Vaccinations - Balancing Community and Individual Liberties and Rights." *HuffPost*. April 20, 2015. <https://bit.ly/2XBAmrp>

⁹³ Omer et. al., "Vaccine Refusal, Mandatory Immunization, and the Risks of Vaccine-Preventable Diseases."

⁹⁴ Sun, Lena H. 2019b. "U.S. Officials Say Measles Cases Hit 25-year Record High." *The Washington Post*. April 29, https://www.washingtonpost.com/health/2019/04/29/us-officials-say-measles-cases-hit-year-record/?utm_term=.ec10607e5781; and Garces, "The Anti-Vaccination Movement: The Use of Targeted Government Messaging to Mitigate a Public Health Crisis;" Sun, Lena H. 2019c. "Unaware He Had Measles, a Man Traveled from N.Y. to Michigan, Infecting 39 People." *The Washington Post*. April 16, 2019. <https://beta.washingtonpost.com/health/2019/04/16/how-patient-zero-spread-measles-across-state-lines-infected-people/>.

kosher or halal due to some of their use of aborted cells in the development process, to the belief vaccines interrupt God's plan.⁹⁵ All but five states: Maine, New York, California, Mississippi, and West Virginia, allow religious exemptions for vaccinations in school-age children prior to attending public school.⁹⁶

In 2015, Senate Bill 277 (SB 277) was introduced in California as a response to the herd immunity threshold not being met in their public schools and the 2014 measles outbreak in Disneyland.⁹⁷ The purpose of the bill was to remove all personal belief exemptions as a means for parents to avoid vaccinations for their children, except for medical purposes.⁹⁸ However, this legislation was met with a number of lawsuits from activists who believed it violated their First Amendment right to freedom of religion.⁹⁹ The First Amendment argument was rejected in state court as it was previously determined by the Supreme Court in *Prince v. Massachusetts* that, "the right to practice religion freely does not include liberty to expose the community or the child to communicable disease or the latter to ill health or death."¹⁰⁰ According to this Court decision, the state also has the authority to regulate the treatment and actions of children.

⁹⁵ Dias, Elizabeth. "Measles Outbreak: What Are Religious Exemptions for Vaccinations?" *The New York Times*. March 27, 2019. <https://www.nytimes.com/2019/03/27/us/measles-vaccine-exemptions.html>; and Garces, "The Anti-Vaccination Movement: The Use of Targeted Government Messaging to Mitigate a Public Health Crisis."

⁹⁶ "States With Religious and Philosophical Exemptions From School Immunization Requirements." *National Conference of State Legislatures*. June 14, 2019. <http://www.ncsl.org/research/health/school-immunization-exemption-state-laws.aspx>.

⁹⁷ Haelle, Tara. "California Vaccination Bill SB 277 Signed By Governor, Becomes Law." *Forbes*. June 30, 2015. <https://www.forbes.com/sites/tarahaelle/2015/06/30/california-vaccination-bill-sb-277-signed-by-governor-becomes-law/#4c70c540385c>.

⁹⁸ Kaplan, Karen. "Here's What Happened after California Got Rid of Personal Belief Exemptions for Childhood Vaccines." *Los Angeles Times*. October 29, 2018. <https://www.latimes.com/science/sciencenow/la-sci-sn-vaccine-medical-exemptions-20181029-story.html>; and Garces, "The Anti-Vaccination Movement: The Use of Targeted Government Messaging to Mitigate a Public Health Crisis."

⁹⁹ Reiss, Dorit. "California Court of Appeal Rejects Challenge to Vaccine Law." *Bill of Health*. October 22, 2018. <http://blog.petrieflom.law.harvard.edu/2018/07/30/california-court-of-appeal-rejects-challenge-to-vaccine-law/>.

¹⁰⁰ *Prince v. Massachusetts*, 321 U.S. 158 (1944).

Furthermore, the notion that parental jurisdiction is not an absolute right and can be restricted in the interest of the child was established.¹⁰¹

Sarah Prince had originally been accused of violating the labor laws in Massachusetts by allowing her nine-year-old niece, to whom she shared custody, to sell religious materials to the public. However, Prince argued the labor laws violated their religious freedom and her parental rights under the Fourteenth Amendment as they were both ordained Jehovah's Witnesses ministers.¹⁰²

Despite such arguments, the Court upheld the state's duty to "protect the welfare of children" and their "authority over children's activities is broader than over like actions of adults...A democratic society rests, for its continuance, upon the healthy, well-rounded growth of young people into full maturity as citizens" and that "freedom of the press and of religion is subject to incidental regulation to the slight degree."¹⁰³ It was, therefore, determined that neither parents nor guardians may claim religious freedoms when there is a possible endangerment to the health of a child or the general public.¹⁰⁴ As such, 71 years later, California SB 277 was upheld.

Some legal scholars, such as Cole, find this form of court paternalism to be acceptable when children are involved.¹⁰⁵ However, in the case of adults, such measures can be considered immoral due to the notion the vast majority of public health concerns can be explained to them to a satisfactory degree. Therefore, the decision to be immunized is at the discretion of the individual who will ultimately be impacted by either

¹⁰¹ *Prince v. Massachusetts*, 321 U.S. 158 (1944).

¹⁰² *Ibid.*

¹⁰³ *Ibid.*

¹⁰⁴ Moser, Charlotte A., Dorit Reiss, and Robert L. Schwartz. "Funding the Costs of Disease Outbreaks Caused by Non- Vaccination." *The Journal of Law, Medicine & Ethics* 43, no. 3 (2015): 633-647.

¹⁰⁵ Cole, Philip. "The moral bases for public health interventions."

choice.¹⁰⁶ In addition, Cole does not prescribe to the notion the state has the obligation to ensure herd immunity for its residents. In his opinion, an individual should not have to endure a medical procedure for the benefit of another who chose not to undergo the same.¹⁰⁷

However, there are special circumstances for which the decision to refuse vaccinations has catalytic consequences. In the case of the MMR vaccine, the use of the commonweal rationale may be appropriate to protect those are not medically eligible to receive such treatment and would, therefore, solely depend upon herd immunity.¹⁰⁸

Nonetheless, SB 277 was not as effective in mandating vaccines for children. On the contrary, California experienced substantial increases in medical exemptions. Prior to the bill, for example, there was only 0.2 percent of excused student cases due to medical exemptions, but by 2018, the number of cases had tripled.¹⁰⁹ While part of this increase was due to children who genuinely qualified under medical exemptions but applied under personal beliefs because of its ease, a vast majority were proven to be from false claims.¹¹⁰

To further review the impact of SB 277, the University of Pennsylvania in conjunction with the Health Officers Association of California, conducted a study. They found several referrals were made by unqualified personnel such as nurse practitioners and medical professionals who often do not treat children such as cardiologists and

¹⁰⁶ Ibid.

¹⁰⁷ Cole, Philip. "The moral bases for public health interventions."

¹⁰⁸ Ibid.

¹⁰⁹ Kaplan, "Here's What Happened after California Got Rid of Personal Belief Exemptions for Childhood Vaccines;" and Garces, "The Anti-Vaccination Movement: The Use of Targeted Government Messaging to Mitigate a Public Health Crisis."

¹¹⁰ Ibid.

dermatologists.¹¹¹ There were also reports of abuse as some physicians would falsely advertise their ability to sign exemptions for a monetary commission while other physicians would sell “temporary” exemptions which needed to be renewed every three months. However, this renewal process is not valid and does not exist.¹¹² Unfortunately, health officials are not allowed to intervene in these types of practices unless a school nurse or administrator directly contacts their local agency, for which there is then little to no consequences for the physicians.¹¹³

The recent 2019 measles outbreaks have led states such as New York to declare a public health emergency.¹¹⁴ In June 2019, New York also followed California, Maine, West Virginia, and Mississippi in repealing religious exemptions for school immunization.¹¹⁵ These state-sponsored non-medical repeal efforts continue to expand as Arizona, Washington, Minnesota, and Iowa are also trying to introduce bills to remove personal and philosophical exemptions while legislators in New Jersey and Vermont are trying to reduce the use of religious exemptions.¹¹⁶

According to the New Jersey Department of Health, in the 2017-2018 school year, there were over 12,000 cases of religious exemptions reported compared to the 1,641 cases in 2005-2006.¹¹⁷ Since these exemptions have become avenues for vaccine-hesitant and resistant parents to circumvent school-mandated immunizations, it is paramount they

¹¹¹ Ibid.

¹¹² Kaplan, "Here's What Happened after California Got Rid of Personal Belief Exemptions for Childhood Vaccines;" and Garces, "The Anti-Vaccination Movement: The Use of Targeted Government Messaging to Mitigate a Public Health Crisis."

¹¹³ Ibid.

¹¹⁴ Pager and Mays, "New York Declares Measles Emergency, Requiring Vaccinations in Parts of Brooklyn."

¹¹⁵ Blint-Welsh, "New York Ends Religious Exemptions for School Vaccinations."

¹¹⁶ Sun, 2019a. "Anti-vaxxers Face Backlash as Measles Cases Surge"; and Garces, "The Anti-Vaccination Movement: The Use of Targeted Government Messaging to Mitigate a Public Health Crisis."

¹¹⁷ Rabin, Roni Caryn. "Eager to Limit Exemptions to Vaccination, States Face Staunch Resistance." *The New York Times*. June 14, 2019. <https://www.nytimes.com/2019/06/14/health/vaccine-exemption-health.html>.

are repealed in the interest of public safety. However, due to the forceful anti-vaccination sentiment in these regions, there have been several failed bipartisan legislation initiatives.¹¹⁸

A Case for Federally Mandated Vaccinations

Although several Supreme Court cases have upheld the legitimacy of state intervention to protect the health of the public, these are exemplary instances for which the states have failed to fulfill such duties. As it stands today, under the Public Health Service Act (PHSA), the federal government may interject if the disease was introduced from outside the country or between states.¹¹⁹

During World War II, Public Health Service (PHS) officials were charged with the additional task of controlling infectious diseases, such as malaria, that began to proliferate due to the war. An immediate challenge to this effort was the void left from a significant number of physicians being deployed to care for the military. As a result, and given the public weariness of soldiers returning home with communicable diseases, the PHS had to enlist non-medical professionals to aid with quarantine measures.¹²⁰

These forces led to the creation of the PHSA of 1944. Although it did not contain a significant number of new laws, the Act synthesized the public health measures already in place and as such, was met with considerable approval. Under the PHSA, the United States Surgeon General is given the authority to quarantine people suspected of the

¹¹⁸ Sun, 2019a. "Anti-vaxxers Face Backlash as Measles Cases Surge;" and Garces, "The Anti-Vaccination Movement: The Use of Targeted Government Messaging to Mitigate a Public Health Crisis."

¹¹⁹ "Who Has the Authority to Enforce Isolation and Quarantine Because of a Communicable Disease?," August 21, 2015. <https://www.hhs.gov/answers/public-health-and-safety/who-has-the-authority-to-enforce-isolation-and-quarantine/index.html>.

¹²⁰ Vanderhook, Katherine. "A history of federal control of communicable diseases: section 361 of the Public Health Service Act." (2002).

communicable diseases listed in presidential executive orders and by the CDC, such as, cholera, infectious tuberculosis, yellow fever, SARS, and more recently, COVID-19.¹²¹

The amendment to the PHSA provided greater funding toward x-ray equipment to widen the availability of medical screening procedures for tuberculosis as cases were rising in Europe and causing approximately 60,000 deaths per year in the United States alone. In addition to the public health crisis, tuberculosis also had a significant impact on the economy as the fatal disease infected those between the ages of 15 and 35 the most, thus targeting a crucial segment of the American workforce.¹²² The intersectionality between public health and the economy was recognized by the federal government and later by the courts.

Although over time the quarantine powers of the federal government were relaxed as more successful vaccines against infectious diseases entered the market, the ability of the Food & Drug Administration to control interstate commerce through the PHSA was upheld by the Supreme Court in *State of Louisiana et al. v. David Mathews, Secretary of Health, Education & Welfare, et al.* (1977). “In upholding the regulation, the court referred to the broad, flexible powers granted to federal health authorities who must use their judgment in attempting to protect the public against the spread of communicable disease.”¹²³

While the majority of the measles cases across the United States began with the exposure of unvaccinated Americans returning home from regions in the midst of

¹²¹ Ibid; “What Diseases Are Subject to Federal Isolation and Quarantine Law?,” March 27, 2020. <https://www.hhs.gov/answers/public-health-and-safety/what-diseases-are-subject-to-federal-isolation-and-quarantine-law/index.html>.

¹²² Vanderhook, Katherine. "A history of federal control of communicable diseases: section 361 of the Public Health Service Act."

¹²³ Ibid.

outbreaks such as the Philippines, Ukraine, and Israel, the federal government has left the matter to the states despite meeting these conditions of intervention.¹²⁴

International Epidemic

The number of measles cases in the United States nearly tripled from 120 to 349 between 2017 and 2018, and then again between 2018 and 2019 with 1,182 cases as of August 2019.¹²⁵ According to the CDC, this spike can in part be accredited to the number of travelers coming back from Israel, where there is a measles outbreak with over 3,400 confirmed cases since 2018.¹²⁶ It is also believed these travelers, upon returning to the United States, must have spread the disease through interactions with unvaccinated populations within the New York and New Jersey Orthodox Jewish communities.¹²⁷

In January 2019, Governor Jay Inslee of Washington State declared a state of emergency due to the confirmation of 26 measles cases at the time. He stated this disease had the potential to “be fatal in small children,” and due to its rapid nature, “creates an extreme public health risk that may quickly spread to other counties” such as Clark

¹²⁴ Sun, Lena H. 2019c. "Officials Fighting U.S. Measles Outbreaks Threaten to Use Rare Air Travel Ban." *The Washington Post*. May 24, https://www.washingtonpost.com/health/2019/05/23/officials-fighting-us-measles-outbreaks-threaten-use-rare-air-travel-ban/?utm_term=.1ab22d19b092; and Garces, “The Anti-Vaccination Movement: The Use of Targeted Government Messaging to Mitigate a Public Health Crisis.”

¹²⁵ Romo and Neighmond, "Washington State Officials Declare State Of Emergency As Measles Outbreak Continues." *NPR*. January 29, 2019. <https://www.npr.org/2019/01/28/689549375/washington-state-officials-declare-state-of-emergency-as-measles-outbreak-contin>; "Measles Cases and Outbreaks | CDC." Centers for Disease Control and Prevention.

¹²⁶ Romo and Neighmond, "Washington State Officials Declare State Of Emergency As Measles Outbreak Continues;" Bever, Lindsey. "An Israeli Flight Attendant Contracted Measles. Officials Are Now Urging Crews to Get Vaccinated." *The Washington Post*. April 17, 2019. https://www.washingtonpost.com/health/2019/04/17/an-israeli-flight-attendant-contracted-measles-officials-are-now-urging-crews-get-vaccinated/?utm_term=.034354d2daaa.

¹²⁷ Romo and Neighmond, "Washington State Officials Declare State Of Emergency As Measles Outbreak Continues."

County where vaccination rates were at 78 percent and some schools in the area at less than 40 percent.¹²⁸

The measles cases in Washington State have continued to grow as the number of confirmed cases since July 2019 has risen to 85.¹²⁹ However, this number may only be the outset of the epidemic as Washington state epidemiologist Scott Lindquist suggests “many of the families with infected children traveled to very public places, including Costco, Ikea, [and] the Portland International Airport.”¹³⁰ Families with children or pregnant women who are immunocompromised are especially at risk of escalating the outbreak during travel as the notable rash associated with the measles may not appear until four days after infection.¹³¹

Moreover, the epidemic was not an isolated incident within the United States. In 2017, the WHO European Region reported more than 24,000 measles cases in Russia, Ukraine, and Serbia combined, compared to 5,000 the year prior. In 2018, countries such as France, Italy, Romania, Ireland, and Slovakia also experienced an exponential rise in measles cases and by the end of the year, had over 83,500 confirmed cases and 74 deaths as a result.¹³²

¹²⁸ Ibid; Lambert, Jonathan. "Measles Cases Mount In Pacific Northwest Outbreak." *NPR*. February 08, 2019. <https://www.npr.org/sections/health-shots/2019/02/08/692665531/measles-cases-mount-in-pacific-northwest-outbreak>.

¹²⁹ "Measles 2019." Washington State Department of Health. July 16, 2019. <https://www.doh.wa.gov/YouandYourFamily/IllnessandDisease/Measles/Measles2019>.

¹³⁰ Romo and Neighmond, "Washington State Officials Declare State Of Emergency As Measles Outbreak Continues."

¹³¹ Ibid.

¹³² Scutti, Susan. "Measles Outbreak in Israel Prompts Warning in NY." *CNN*. January 29, 2019. <https://www.cnn.com/2018/11/06/health/measles-outbreak-nyc-israel/index.html>; “Measles – European Region,” September 10, 2019. <https://www.who.int/csr/don/06-may-2019-measles-euro/en/>.

In the first three months of 2019, the number of measles cases rose 300 percent worldwide and 700 percent in Africa alone.¹³³ The Democratic Republic of the Congo (DRC), for instance, is currently in the midst of a coronavirus outbreak as well as the world's largest measles and second-largest Ebola epidemic.¹³⁴ As of June 2020, there were over 3,400 cases of Ebola and more than 311,000 cases of the measles in the DRC.¹³⁵ As of September 2020, there were over 10,000 cases of COVID-19.¹³⁶ However, the measles has caused the death of over 6,500 Congolese, which is more than Ebola and COVID-19 combined.¹³⁷

By June 2019, the WHO was notified of over 112,000 cases across 170 countries, compared to just over 28,000 cases across 163 countries last year.¹³⁸ Meaning, in the first six months of the year, the world experienced its greatest number of measles cases since 2006 and the gravity of these outbreaks stressed already vulnerable health care systems.¹³⁹

¹³³ Lane, Lea. "Latest News About The Measles Outbreak, International Travel, And Preventative Measures." *Forbes*. June 02, 2019. <https://www.forbes.com/sites/lealane/2019/06/02/latest-news-about-the-measles-outbreak-international-travel-and-preventative-measures/#73e4c1d68cfc>.

¹³⁴ "New Ebola Outbreak Detected in Northwest Democratic Republic of the Congo; WHO Surge Team Supporting the Response." World Health Organization. World Health Organization, June 1, 2020. <https://www.who.int/news-room/detail/01-06-2020-new-ebola-outbreak-detected-in-northwest-democratic-republic-of-the-congo-who-surge-team-supporting-the-response>; "Ebola Health Update - North Kivu/Ituri, DRC, 2018-2020." World Health Organization. World Health Organization, July 3, 2020. <https://www.who.int/emergencies/diseases/ebola/drc-2019>.

¹³⁵ Nachega, Jean B., Placide Mbala-Kingebeni, John Otshudiema, Alimuddin Zumla, and Jean-Jacques Muyembe Tam-Fum. "The colliding epidemics of COVID-19, Ebola, and measles in the Democratic Republic of the Congo." *The Lancet Global Health* 8, no. 8 (2020): e991-e992.

¹³⁶ "COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)," 2020. <https://coronavirus.jhu.edu/map.html>.

¹³⁷ Maclean, Ruth. "New Ebola Outbreak in Congo, Already Hit by Measles and Coronavirus." *The New York Times*. The New York Times, June 1, 2020.

<https://www.nytimes.com/2020/06/01/world/africa/ebola-outbreak-congo.html>; "Ebola Health Update - North Kivu/Ituri, DRC, 2018-2020;" "COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)."

¹³⁸ Lane, Lea. "Latest News About The Measles Outbreak, International Travel, And Preventative Measures."

¹³⁹ "New Measles Surveillance Data from WHO." World Health Organization. World Health Organization, August 12, 2019. <https://www.who.int/immunization/newsroom/new-measles-data-august-2019/en/>.

Due to its airborne nature, the measles can rapidly spread through the respiratory tract. As such, this makes the measles nine times more contagious than Ebola, where bodily fluids must be shared in order for the infection to spread.¹⁴⁰ The federal government must, therefore, treat the measles outbreak with even greater vigilance than it did the 2014 Ebola crisis when it established travel screenings and restrictions as well as ensured coordination between local, state, and federal health administrators.¹⁴¹

Similarly, health officials in Oklahoma, Illinois, Washington, and New York have commenced issuing travel warnings for those believed to be infected with the measles. In essence, health officials in these states are now prepared to place infected individuals with travel plans on the federal “Do Not Board List” if there is a lack of compliance. The CDC currently manages this list and by May 2019, was contacted regarding eight potential travelers. As a result, all eight agreed to cancel their flights.¹⁴² According to the CDC, this has to be an effective measure to deter highly contagious individuals from traveling and therefore potentially infecting more populations. However, placing an unvaccinated individual on the “Do Not Board List” should be considered as a last resort if they do not respond to the counsel of their doctor.¹⁴³

Hence, the government should invest in additional training for healthcare providers and school administrators and staff in order for effective conversations with the

¹⁴⁰ Brodwin, Erin. "Here's How Much More Contagious Measles Is than Ebola." *Business Insider*. February 02, 2015. <https://www.businessinsider.com/how-much-more-contagious-is-measles-than-ebola-2015-2>.

¹⁴¹ The White House Office of the Press Secretary. "FACT SHEET: The U.S. Government's Response to Ebola at Home and Abroad." National Archives and Records Administration. October 22, 2014. <https://obamawhitehouse.archives.gov/the-press-office/2014/10/22/fact-sheet-us-government-s-response-ebola-home-and-abroad>.

¹⁴² Sun, 2019c, "Officials Fighting U.S. Measles Outbreaks Threaten to Use Rare Air Travel Ban;" Garces, Catherine, "The Anti-Vaccination Movement: The Use of Targeted Government Messaging to Mitigate a Public Health Crisis."

¹⁴³ Sun, 2019c, "Officials Fighting U.S. Measles Outbreaks Threaten to Use Rare Air Travel Ban"

vaccine-hesitant or resistant communities to take place on a more personal level, due to the nature of such a decision for many.¹⁴⁴

Interstate Epidemic

There have also been several instances of interstate exposure to the measles due to the failure of meeting vaccine thresholds. Such events provide a legal basis, under the PHSA, for the United States Surgeon General to interject in these state matters as the federal government is “authorized to make and enforce such regulations as in his judgment are necessary to prevent the introduction, transmission, or spread of communicable diseases from...one State or possession into any other State or possession.”¹⁴⁵

The federal government could have intervened in the 1994 measles case of an infected Colorado resort guest who exposed the disease to five other unvaccinated students due to religious exemptions.¹⁴⁶ One of the five students returned home to Illinois and infected 51 people followed by an additional 156 people after returning to her boarding school in Missouri. The other four students later exposed residents in Maine, New York, Michigan, Texas, Washington, Maryland, California, and further into Colorado.¹⁴⁷ During this time period, school-age children with religious or philosophical

¹⁴⁴ Arede, Margarida, Maria Bravo-Araya, Émilie Bouchard, Gurlal Singh Gill, Valerie Plajer, Adiba Shehraj, and Yassir Adam Shuaib. "Combating Vaccine Hesitancy: Teaching the Next Generation to Navigate Through the Post Truth Era." *Frontiers in public health* 6 (2018); and Garces, "The Anti-Vaccination Movement: The Use of Targeted Government Messaging to Mitigate a Public Health Crisis."

¹⁴⁵ Hughes, "Vaccine Exemptions And The Federal Government's Role."

¹⁴⁶ "Measles -- United States, 1994." *Centers for Disease Control and Prevention*. July 07, 1995. <https://www.cdc.gov/mmwr/preview/mmwrhtml/00038118.htm>.

¹⁴⁷ Riley, Jason L. "Opinion | No Religious Exemptions From Vaccines." *The Wall Street Journal*. May 14, 2019. <https://www.wsj.com/articles/no-religious-exemptions-from-vaccines-11557875456>.

vaccine exemptions accounted for 73 percent of all outbreak cases and 56 percent of all cases related to measles.¹⁴⁸

Despite such incidence, recent data from the Colorado Department of Public Health and Environment has confirmed the decline in the state's immunization rate for four out of five required vaccines needed to attend the 2018-2019 public school year. This statistic comes at a time when the CDC has already deemed Colorado to have the lowest MMR vaccination rate in the country.¹⁴⁹ However, rather than repealing non-medical exemptions, Colorado Governor Jared Polis recommended increasing the public education on immunizations stating, "I'm pro-choice...I think it's your body and it's your decision."¹⁵⁰ However, outbreaks of vaccine-preventable diseases often begin with individuals who have expressed resistance and due to its highly contagious nature, the disease can quickly spread to the under-vaccinated population and then ultimately into other subpopulations.¹⁵¹

This was exemplified in the 2014 Disneyland measles outbreak in California. Notwithstanding the measures taken to amend their vaccination laws, more than 147 people from seven states were exposed to the disease.¹⁵² This is an occurrence where the establishment of federally mandated vaccinations should have been sanctioned as this cross-state outbreak can be traced back to the theme park.¹⁵³

¹⁴⁸ "Measles -- United States, 1994." Centers for Disease Control and Prevention.

¹⁴⁹ Staver, Anna. "Colorado's Worst-in-the-nation Measles Vaccination Rate Drops Again." *The Denver Post*. June 14, 2019. [https://www.denverpost.com/2019/06/13/colorado-vaccination-measles-immunization-2019/?utm_campaign=2019-06-17 Stateline Daily&utm_medium=email&utm_source=Pew](https://www.denverpost.com/2019/06/13/colorado-vaccination-measles-immunization-2019/?utm_campaign=2019-06-17%20Stateline%20Daily&utm_medium=email&utm_source=Pew).

¹⁵⁰ Ibid.

¹⁵¹ Omer et. al., "Vaccine Refusal, Mandatory Immunization, and the Risks of Vaccine-Preventable Diseases."

¹⁵² Riley, "Opinion | No Religious Exemptions From Vaccines."

¹⁵³ Hughes, "Vaccine Exemptions And The Federal Government's Role."

Proposed Federal Actions for Mandatory Vaccinations

The contemporary measles outbreaks had interstate and international elements. Therefore, in accordance to the PHSA, the federal government would be able to take the necessary actions needed in order to circumvent the public health emergency at hand. However, according Section 361 of the PHSA, “nothing in this section...or the regulations promulgated under such sections, may be construed as superseding any provision under State law, except to the extent that such a provision conflicts with an exercise of Federal authority.”¹⁵⁴

As such, the federal government would need to establish a statute that would “preempt state laws...either requiring immunization...or expressly forbidding non-medical exemptions.”¹⁵⁵ Congress could do so through the use of Article 1, Section 8, Clause 3 of the United States Constitution as it allows the legislative branch “to regulate commerce...among the several states.”¹⁵⁶ The federal government already stems its authority over public health emergencies from the Commerce Clause.¹⁵⁷ However, it could make a case to extend its reach to vaccinations as the spread of a highly contagious disease puts a substantial and aggregated economic burden on state and federal public health agencies. Measles outbreaks, for instance, can cost hundreds of thousands to millions of tax-payer dollars, especially when state borders are crossed .¹⁵⁸

¹⁵⁴ “42 U.S. Code § 264 - Regulations to Control Communicable Diseases.” Legal Information Institute. Legal Information Institute, July 1, 1944. <https://www.law.cornell.edu/uscode/text/42/264>.

¹⁵⁵ Ibid.

¹⁵⁶ U.S. Constitution, art. 1, sec. 8, cl.3

¹⁵⁷ Cole, Jared P., Swendiman, Kathleen S. “An Overview of State and Federal Authority to Impose Vaccination Requirements.” Congressional Research Service, May 22, 2019. <https://www.hsdl.org/?abstract&did=754461>

¹⁵⁸ Moser et. al., Moser, Charlotte A., Dorit Reiss, and Robert L. Schwartz. "Funding the Costs of Disease Outbreaks Caused by Non- Vaccination;" *United States v. Lopez*, 514 U.S. 549, 115 S. Ct. 1624, 131 L. Ed. 2d 626 (1995).

This was exhibited in 2011 when it was estimated that because of the 16 measles outbreaks that occurred across the country, public health entities endured between \$2.8 million and \$5.5 million in costs.¹⁵⁹ In 2018, Arkansas experienced just one case of the measles and it cost the state \$47,972, which is considered a consistent cost per case through the nation. Meaning by April 2019, with just 695 cases experienced in 22 states, the country endured an estimated \$30 million in costs.¹⁶⁰ This high accural rate is in part due to the fact that as this disease is highly contagious and can linger in the air for up to two hours, it has the capacity to impact a large number of individuals through this initial exposure and for 21 days thereafter, those same individuals can infect others they come into contact with. Therefore, requiring substantial contact tracing efforts and further straining health systems resources.¹⁶¹

Historically, the Supreme Court has objected to Congress' use of the Commerce Clause to regulate societal issues such as violence against women and gun control. However, public health emergencies, unlike the Court's opinion in *United States v. Morrison* (2000) or *United States v. Lopez* (1995), are an economic issue.¹⁶² This is exhibited at the very moment of this writing.

During the current COVID-19 pandemic, public health and government officials have warned against interstate travel for the holidays as it is predicted to cause and exacerbate surges in case numbers and deaths.¹⁶³ In fact, the unprecedented recent rise in

¹⁵⁹ Ibid.

¹⁶⁰ Henney, Megan. "The Cost of This Century's Worst Measles Outbreak." Fox Business. Fox Business, April 30, 2019. <https://www.foxbusiness.com/healthcare/economic-cost-measles-outbreak>.

¹⁶¹ Ibid.

¹⁶² *United States v. Morrison*, 529 U.S. 598, 120 S. Ct. 1740, 146 L. Ed. 2d 658 (2000); *United States v. Lopez*, 514 U.S. 549, 115 S. Ct. 1624, 131 L. Ed. 2d 626 (1995).

¹⁶³ Brown, Kristen. "Thanksgiving Travel Data Point to Surge in Covid Infections and Deaths," November 30, 2020. <https://www.bloomberg.com/news/articles/2020-11-30/thanksgiving-travel-data-point-to-surge-in-covid-infections-and-deaths>.

COVID-19 cases has led states to issue new restrictions and stay-at-home orders which has, in turn, been impacting commerce and thus delaying economic recovery.¹⁶⁴ The economic case for Congress to utilize the Commerce Clause for vaccine provisions is apt.

Although in *Jacobson v. Massachusetts*, the Supreme Court ruled in favor of the states' police power, opponents of federally mandated vaccinations, such as Senator Rand Paul, may argue that this provision is inconsistent with the founding principles of this country such as individualism and liberty.¹⁶⁵ However, the fine line of where one person's individual liberty ends and that of another begins is also inconsistent and subject to a variety of interpretations. That is, although an individual may opt-out of a measles vaccination, the implications of that choice does not end with that individual. The cumulative effect of such decisions cause outbreaks, which particularly victimize segments of the population that are also under vaccinated and with medical exemptions. As such, it is incumbent upon the federal government to limit such outbreaks and to protect public health and in doing so protect the nation from economic crises.

Congress has already made certain vaccines, such as the MMR vaccine, compulsory for military personnel and immigrants seeking permanent placement in the United States. If the same standard were to apply for its current residents, the federal government would need to ensure that it is not in violation of the Tenth Amendment or

¹⁶⁴ Lynch, David. "Raging Virus Triggers New Shutdown Orders and Economy Braces for Fresh Wave of Pain." The Washington Post. WP Company, November 15, 2020.

<https://www.washingtonpost.com/business/2020/11/14/coronavirus-shutdown-orders-economy/>.

¹⁶⁵ Kelly, Caroline. "GOP Senator Defends Mandatory Vaccinations after Paul Says They're Inconsistent with Liberty," March 7, 2019. <https://www.cnn.com/2019/03/06/politics/rand-paul-bill-cassidy-vaccines/index.html>.

the Religious Freedom Restoration Act of 1993, which will ultimately be decided by the Supreme Court.¹⁶⁶

Supplementary Reasons for Low Vaccination Rates

Despite the rise of religious and philosophical exemptions reported in schools across the country, another important reason children are not receiving vaccinations is due to poverty and access to healthcare. This is especially true in the nation's capital, where only 75 percent of uninsured children between the ages of 1 and 3 years have received at least one dose of the MMR vaccine, compared to 90 to 94 percent of children who are privately insured or on Medicaid.¹⁶⁷

Vaccine related issues, compared to gun violence, drug abuse, or teenage pregnancy, may not appear to be a top priority for educators or administrators working on the medical needs of their school communities. However, the resurgence of measles has a direct effect on the attendance and performance of students.¹⁶⁸ Additionally, when compared to the other health priorities, these vaccine-preventable diseases already have a solution and established state law that can help reduce its prevalence. It is just a matter of will and execution. As such, all available tools should be utilized to maximize school attendance and to protect the ability of all students to thrive.

¹⁶⁶ Cole, Jared P., Swendiman, Kathleen S. "An Overview of State and Federal Authority to Impose Vaccination Requirements;" "Vaccination Requirements." USCIS, January 10, 2020. <https://www.uscis.gov/tools/designated-civil-surgeons/vaccination-requirements>.

¹⁶⁷ Simmons-Duffin, Selena. "The Other Reasons Kids Aren't Getting Vaccinations: Poverty And Health Care Access." *NPR*. May 20, 2019. <https://www.npr.org/sections/health-shots/2019/05/20/724468630/the-other-reasons-kids-arent-getting-vaccinations-poverty-and-health-care-access>.

¹⁶⁸ Lindley, Megan C., Lynda Boyer-Chu, Daniel B. Fishbein, Maureen Kolasa, Amy B. Middleman, Thad Wilson, JoEllen Wolicki, and Susan Wooley. "The role of schools in strengthening delivery of new adolescent vaccinations." *Pediatrics* 121, no. Supplement 1 (2008): S46-S54.

In response to the 1990s measles epidemic, the federal government established the Vaccines for Children (VFC) program in 1994 to provide children on Medicaid or uninsured with free immunizations.¹⁶⁹ However, under this program, some doctors may still charge for the physical administration of the vaccine and/or office visit. Such charges undermine the purpose and reach of the program. In the event the federal government was to mandate immunization for highly contagious vaccine-preventable diseases, there would need to be a considerable expansion of this program given that there are just over 44,000 doctors participating in VFC.¹⁷⁰

Although expanding the VFC program would require an increased budget, the additional benefits and considerable cumulative savings in related costs would more than compensate for the higher expense. In fact, according to the CDC, if American children born between 1994 and 2018 were to be vaccinated, it is estimated that over 419 million illnesses would be prevented as well as the avoidance of over 936,000 deaths. In addition, the country would “save nearly \$1.9 trillion in societal costs (that includes \$406 billion in direct costs)” which is greater than \$5,000 per American.¹⁷¹

Conclusion

The measles, due to its airborne nature, is one of the most contagious diseases in the world and has a greater infection rate than that of Ebola.¹⁷² Children who are not

¹⁶⁹ Simmons-Duffin, Selena. "The Other Reasons Kids Aren't Getting Vaccinations: Poverty And Health Care Access."

¹⁷⁰ "VFC | About the Program | Vaccines for Children Program | CDC." *Centers for Disease Control and Prevention*. February 18, 2016. <https://www.cdc.gov/vaccines/programs/vfc/about/index.html>.

¹⁷¹ Whitney, Cynthia G., Fangjun Zhou, James Singleton, Anne Schuchat. "Benefits from Immunization During the Vaccines for Children Program Era — United States, 1994–2013." *Center for Disease Control and Prevention Morbidity and Mortality Weekly Report* 63, no. 16 (2014): 352-355.

¹⁷² "Measles." World Health Organization; Brodwin, "Here's How Much More Contagious Measles Is than Ebola."

immunized against this vaccine-preventable disease are 22 to 35 times more likely to get the measles in the event of an outbreak.¹⁷³ Despite such risks, non-medical exemptions continue to be widely used today and are at the root cause of the largest measles outbreak in the United States in 25 years.¹⁷⁴ Whether due to protests from the vaccine-hesitant and resistant communities or the civil liberty concerns expressed by legislators, the failure of states such as Oregon to effectively remove all non-medical exemptions from its vaccination laws poses a threat to the nation and to the international community.¹⁷⁵

Although there have been over 1,200 confirmed cases across 23 states, only five states have managed to repeal religious exemptions from their school-mandated immunizations.¹⁷⁶ The failure of the remaining 45 states to repeal such threats to public welfare necessitates the establishment of federally mandated immunizations.

The federal intervention capability that currently exists must be better defined and executed, but most importantly, it must be expanded to include all possibilities to ensure the highest public welfare. This includes further evaluation of the United States healthcare system as a significant number of children are not immunized due to their low socio-economic status and/or lack of medical insurance.

Finally, there must also be a public discussion and debate on the national security threat posed by these highly contagious and potentially deadly diseases. Herd immunity needs to be established and maintained as the only effective mechanism to decrease the

¹⁷³ Salmon, et. al. "Compulsory vaccination and conscientious or philosophical exemptions: past, present, and future."

¹⁷⁴ Cai, et. al. "Largest U.S. Measles Outbreak in 25 Years Surpasses 800 Cases."

¹⁷⁵ Rabin, "Eager to Limit Exemptions to Vaccination, States Face Staunch Resistance."

¹⁷⁶ Blint-Welsh, Tyler. "New York Ends Religious Exemptions for School Vaccinations;" Cai, et. al. "Largest U.S. Measles Outbreak in 25 Years Surpasses 800 Cases;" "States With Religious and Philosophical Exemptions From School Immunization Requirements." *National Conference of State Legislatures*.

risks of having such contagious diseases harnessed as a bioweapon while at the same time serving to protect those considered immunocompromised. This risk is especially prevalent in cities such as Washington, DC where the vaccination rates among children are considerably low and there is a high volume of travelers, government officials, and diplomats who regularly enter the capital.¹⁷⁷

Federally mandated vaccinations will prevent future outbreaks of deadly diseases. In the interest of public health and ultimately national security, it is imperative for the federal government to establish a vaccination system such as the Model State Emergency Health Powers Act. "Vaccination is one of the greatest achievements in medicine and public health"¹⁷⁸ and its administration will save countless of lives within the United States as diseases know no borders and understand no non-medical exceptions.

¹⁷⁷ Salmon, et. al. "Compulsory vaccination and conscientious or philosophical exemptions: past, present, and future."

¹⁷⁸ Ibid.

Chapter 2: The use of executive orders to remove all non-medical vaccine exemptions

Introduction

The measles is one of the most contagious diseases in the world that can cause blindness, deafness, psychological impairment, and even death. Approximately 6 million people are diagnosed with this virus every year. Between 2010 and 2017, nearly 170 million children did not receive their first dose of the measles vaccine.¹⁷⁹ Among high-income countries, in terms of the absence of measles vaccination for children, the United States is at the top of the list with over 2.5 million children not protected followed by France, Britain, Argentina, Italy, and Japan.¹⁸⁰ As such, the measles claims the lives of almost 400 children a day.¹⁸¹

The United States effectively eliminated the measles as a public health problem 20 years ago through the creation of the measles, mumps, and rubella (MMR) vaccine and the combined effort of state and federal governments to establish school immunization requirements. However, this status is in jeopardy as the number of vaccinated individuals has significantly declined largely due to the rise of the anti-vaccination movement throughout the country and the world.¹⁸²

¹⁷⁹ Magra, Iliana. "Over 20 Million Children a Year Miss Out on First Dose of Measles Vaccine." The New York Times. The New York Times, April 25, 2019.
<https://www.nytimes.com/2019/04/25/world/europe/children-measles-vaccine.html>.

¹⁸⁰ "Over 20 Million Children Worldwide Missed out on Measles Vaccine Annually in Past 8 Years, Creating a Pathway to Current Global Outbreaks - UNICEF." Unicef UK, April 25, 2019.
<https://www.unicef.org.uk/press-releases/over-20-million-children-worldwide-missed-out-on-measles-vaccine-annually-in-past-8-years-creating-a-pathway-to-current-global-outbreaks-unicef/>.

¹⁸¹ Magra, Iliana. "Over 20 Million Children a Year Miss Out on First Dose of Measles Vaccine."

¹⁸² Andre, FE, R. Booy, HL Bock, J. Clemens, SK Datta, TJ John, RW Lee, S. Lolekha, H. Peltola, TA Ruff, M. Santosham, and HJ Schmitt. "Vaccination Greatly Reduces Disease, Disability, Death and Inequity Worldwide." *World Health Organization*. March 04, 2011.

In 2019, there have been over 1,200 confirmed cases of measles in the United States and a 300 percent increase in cases worldwide.¹⁸³ However, despite the introduction of legislation that would mandate the immunization of all public school students and congressional hearings surrounding the anti-vaccination movement, Congress has not moved forward with this urgent matter of public health and national security.¹⁸⁴ This could be due to the rise in political polarization which has been reflected upon in Congress. Over the recent decades, this congressional impasse has caused the implementation of bipartisan legislation to be considerably arduous and has effectively given the executive office permission to take the reins in policy making.¹⁸⁵

As an effective response to such emergencies requires proactive government action, in the event Congress does not timely respond, there should be a secondary system created to ensure the safety and relative public health of the American people is not compromised. This alternative could be delivered through the use of presidential executive orders. However, the implications of nationally securitizing vaccine-preventable diseases and federally mandating the control of infection through immunization should be taken under review and into account in terms of public policy.

This chapter will review the potential national security implications of the decline in protections against vaccine-preventable diseases, such as measles, has on the United

¹⁸³ "Measles Cases and Outbreaks | CDC." Centers for Disease Control and Prevention. July 22, 2019. <https://www.cdc.gov/measles/cases-outbreaks.html>; "New Measles Surveillance Data for 2019." World Health Organization. World Health Organization, May 22, 2019. <https://www.who.int/immunization/newsroom/measles-data-2019/en/>.

¹⁸⁴ United States, Congress, "Vaccinate All Children Act of 2019." *Congress.gov*, 2019. www.congress.gov/bills/116/congress/house/bills/2527/cosponsors; Ehley, Brianna. "Rand Paul Condemns Mandatory Vaccines amid Measles Outbreak." *POLITICO*, March 5, 2019. <https://www.politico.com/story/2019/03/05/rand-paul-mandatory-vaccines-measles-1240542>.

¹⁸⁵ Carmines, E. and Edward G. Matthew Fowler. "The Temptation of Executive Authority: How Increased Polarization and the Decline in Legislative Capacity Have Contributed to the Expansion of Presidential Power." *Indiana Journal of Global Legal Studies* 24 (2017): 369 - 397.

States, and whether the President can establish federally mandated immunizations through executive order. Although the United States, has precedent in the securitizing of new and re-emerging infectious diseases, an executive order from the Commander and Chief of the Armed Services could lead to undue consequences such as the militarization of vaccine administration. Alternatively and preferably, Congress, if not the states, should remove all non-medical exemptions from mandatory vaccination laws while the Executive Office focuses on combating the rise of public misinformation which in and of itself also poses as a significant threat to the country.

Vaccines: A Social Contract Implied

The first vaccine was created over two centuries ago during the 1790s, at the height of the smallpox epidemic, by Edward Jenner. Smallpox is a viral disease that has plagued the earth since the beginning of mankind, infecting and killing millions.¹⁸⁶ This devastating disease killed 3 in every 10 infected individuals and usually left its survivors with severe scars. Its declared eradication on May 8, 1980, was made possible through the conviction of United States state and federal governments as well as the investment of the international community to accomplish what was considered to be the greatest public health achievement.¹⁸⁷

However, this global effort was mired with prolonged challenges. During the 1830s, the government faced staunch opposition from anti-vaxxers who believed the established compulsory vaccination laws were a violation of individual liberty. This

¹⁸⁶ Stern, Alexandra Minna, and Howard Markel. "The History Of Vaccines And Immunization: Familiar Patterns, New Challenges." *Health Affairs*, May 2005.

<https://www.healthaffairs.org/doi/full/10.1377/hlthaff.24.3.611>.

¹⁸⁷ "History of Smallpox | Smallpox | CDC." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, August 30, 2016. <https://www.cdc.gov/smallpox/history/history.html>.

matter was eventually settled in 1905 when the Supreme Court ruled in *Jacobson v. Massachusetts* that immunization requirements were constitutional. This was determined on the grounds the state's duty to protect public health outweighed the individual right to privacy.¹⁸⁸

Furthermore, it could be argued that “vaccination isn’t just an individual choice; it’s a social contract entered into by the public and its government.”¹⁸⁹ In the United States, there is an innate public trust the government will secure the proper amount of safe and efficient vaccinations while making it widely available to the public. However, “in return, the government trusts that the citizenry and medical providers will comply and get immunized properly not only to protect themselves and their children but for the sake of the entire society and the herd immunity that prevents diseases from spreading.”¹⁹⁰

This social contract was described in 1651 by Thomas Hobbes in *Leviathan*. According to Hobbes, there are several laws of nature that are not subject to human dispute. The first law is that “by which a man is forbidden to do that which is destructive of his life, or taketh away the means of preserving the same, and to omit that by which he thinketh it may be best preserved.”¹⁹¹ This law of nature speaks to the fundamental truth at the core of vaccinations: That is, the purpose of their creation is to protect humanity from preventable, contagious diseases that can cause serious illnesses and even death among individuals and their greater communities.

¹⁸⁸ Stern, Alexandra Minna, and Howard Markel. “The History Of Vaccines And Immunization: Familiar Patterns, New Challenges.”

¹⁸⁹ Garrett, Laurie. “The World's Many Measles Conspiracies Are All the Same.” *Foreign Policy*, March 6, 2019. <https://foreignpolicy.com/2019/03/06/the-worlds-many-measles-conspiracies-are-all-the-same/>.

¹⁹⁰ Stern, Alexandra Minna, and Howard Markel. “The History Of Vaccines And Immunization: Familiar Patterns, New Challenges.”

¹⁹¹ Thomas Hobbes: Social Contract. (2002). Retrieved from https://oregonstate.edu/instruct/phl201/modules/Philosophers/Hobbes/hobbes_social_contract.html.

In the case of measles, which does not have a treatment once contracted, the only way to safeguard the public from its severe adverse effects is through the administration of the MMR vaccine.¹⁹² Therefore, self-electing to forgo this life-saving vaccine or in the case of parents electing to deny their children this vaccine, not only violates the first law of nature as described by Hobbes but worse still, risks the lives of those medically ineligible to be immunized (cancer patients, newborns, and other immunocompromised individuals) to contract the measles in the absence of their consent. In fact, for those not vaccinated, there is a 90 percent chance of contraction if one were to come into contact with an infected individual or be in the airspace the person once occupied. This is due to the fact the virus can actively remain in the air for up to 2 hours.¹⁹³

Although it is of utmost importance to recognize inherent individual liberty in civil society, the social contract created between an individual, society, and the government should also be acknowledged and beholden. The second Hobbes law of nature proclaims, “man [must] be willing when others are so too...to lay down his right to all things and be contented with so much liberty against other men, as he would allow other men against himself.”¹⁹⁴

This contract is created through the willingness to forgo some individual rights and to bestow it upon either a sovereign or assembly of elites. As a result of this “mutual transferring of rights,” the liberty of the people may be limited, but what is gained in return is greater security.¹⁹⁵ However, despite this framework, there are many at risk of

¹⁹² “For Healthcare Professionals - Diagnosing and Treating Measles | CDC.” Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, February 5, 2018. <https://www.cdc.gov/measles/hcp/index.html>.

¹⁹³ “Vaccine for Measles (MMR Shot) | CDC.” Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, June 13, 2019. <https://www.cdc.gov/measles/vaccination.html>.

¹⁹⁴ Thomas Hobbes: Social Contract.

¹⁹⁵ Ibid.

infection due to a “contractual breach” between the individual, society, and the government largely resulting from the rise of the anti-vaccination movement which in turn has fueled growing vaccine-hesitant and resistant communities.

This authority or “police power” by the states to pass legislation that promoted the safety and welfare of its citizens was reinforced by the Supreme Court in *State v. Hartog* (1989) when the constitutionality of Iowa’s mandatory seat belt law was called into question. According to the Court, the right to autonomy under the Fourteenth Amendment did not apply in this case as the state may restrict any freedoms so long as there is a “reasonable relation to public welfare” such as curbing an epidemic.¹⁹⁶ In addition, since the cost of a car crash injury would be extended to all of society, there is no individual entitlement in the decision to not wear a seat belt.¹⁹⁷

Furthermore, outbreaks are also likely to occur if governments are unable to uphold their end of the contract to provide the medically necessary quantity of vaccines to ensure herd immunity among their citizens. This, in turn, threatens the security of those who consented to the limitation of their rights for the promise of safety. This outcome has occurred in several countries such as the Philippines, Madagascar, and Venezuela where the local measles outbreak arose from the lack of proper public health services.¹⁹⁸ However, this is not the case with the measles outbreak recently experienced in the United States. Rather, the decline in vaccination rates is due to an underlying distrust in the medical community and government as well as skepticism of pharmaceutical companies wanting to make a profit.¹⁹⁹

¹⁹⁶ Moreland-Russell, Sarah. Prevention, policy, and public health. Oxford University Press, 2016.

¹⁹⁷ Ibid.

¹⁹⁸ Garrett, Laurie. “The World's Many Measles Conspiracies Are All the Same.”

¹⁹⁹ Ibid.

The Anti-Vaccination Movement

The resistance and hesitation against the MMR vaccine can be traced back to the 1998 publication of former physician Andrew Wakefield's medical study where he alleged the immunization may predispose children to develop autism. Although the study was proven false by several researchers and epidemiologists, it continued to be globally circulated for over a decade. The paper was eventually retracted in 2010 after financial interests, fraud, and ethics violations surrounding the study was discovered.²⁰⁰ However, Wakefield's claim regarding the potential side-effects of the MMR vaccine continues to be cited today by vaccine-hesitant and resistant individuals as a rationale for their position.²⁰¹ This disinformation has led to a growing number of parents refusing vaccinations for their children.²⁰²

The movement has evolved to also include disinformation that would cause religious objections such as vaccines being comprised of aborted cells and not being kosher or halal. Although these allegations are not true, they are often promoted by prominent leaders in tight-knit religious communities resulting in major outbreaks. This was recently experienced within the Amish community in Ohio and the Orthodox Jewish community in New York where the measles was easily spread due to the lack of sufficient herd immunity.²⁰³

²⁰⁰ Rao, T. S., & Andrade, C. (2011). The MMR vaccine and autism: Sensation, refutation, retraction, and fraud. *Indian journal of psychiatry*, 53(2), 95–96. doi:10.4103/0019-5545.82529

²⁰¹ Roberts, Karin. "When It Comes to Vaccines, Celebrities Often Call the Shots." *NBCNews.com*. NBCUniversal News Group, October 29, 2018. <https://www.nbcnews.com/health/health-care/when-it-comes-vaccines-celebrities-often-call-shots-n925156>.

²⁰² Hussain, Azhar, Syed Ali, Madiha Ahmed, and Sheharyar Hussain. "The anti-vaccination movement: a regression in modern medicine." *Cureus* 10, no. 7 (2018).

²⁰³ Belluz, Julia. "Religion and Vaccine Refusal Are Linked. We Have to Talk about It." *Vox*. Vox, June 19, 2019a. <https://www.vox.com/2019/6/19/18681930/religion-vaccine-refusal>.

There are currently 45 states that allow families to refuse school mandatory vaccines on the grounds of religious and philosophical objections. New York, Maine, and California recently removed all of their non-medical exemptions due to the gravity and number of outbreaks that resulted from the declining vaccination rates.²⁰⁴ Despite several other states such as Washington and Oregon also experienced measles outbreaks due to the dwindling number of individuals protected against the disease, state legislatures have objected to mandating vaccines on the grounds of civil liberties.²⁰⁵ Furthermore, the continued spread of falsified information has also led many to question whether the government and pharmaceutical companies are colluding to conceal harm arising from immunizations, notwithstanding the creation of the National Childhood Vaccine Injury Act of 1986 (NCVIA).²⁰⁶

The Role of Congress in the History of Vaccines

During the 1970s and 1980s, several diseases such as smallpox and polio were eliminated in the United States due to the successful administration of vaccines that protected against these pathogens.²⁰⁷ However, as the number of cases decreased, the public's focus shifted from the disease itself to the injuries caused by vaccines. From 1978 to 1981, for example, there were nine liability suits made against vaccine

²⁰⁴ "States With Religious and Philosophical Exemptions From School Immunization Requirements."

²⁰⁵ Rabin, Roni Caryn. "Eager to Limit Exemptions to Vaccination, States Face Staunch Resistance." *The New York Times*. June 14, 2019. <https://www.nytimes.com/2019/06/14/health/vaccine-exemption-health.html>.

²⁰⁶ Rummier, Orion. "Report: Million-Dollar Donations Fund Anti-Vaccination Movement." *Axios*, June 19, 2019. <https://www.axios.com/report-million-dollar-donations-fund-anti-vaccination-movement-65ca36cf-99f4-4084-9258-67573d15b15d.html>.

²⁰⁷ Praderio, Caroline. "4 Diseases That Have Been Eliminated in the United States in the Last 100 Years." *Insider*, January 25, 2019. <https://www.insider.com/diseases-eliminated-united-states-vaccines-2019-1>; Blake, Valarie. "The National Childhood Vaccine Injury Act and the Supreme Court's Interpretation." *Journal of Ethics | American Medical Association*. American Medical Association, January 1, 2012. <https://journalofethics.ama-assn.org/article/national-childhood-vaccine-injury-act-and-supreme-courts-interpretation/2012-01>.

manufacturers but by the mid-1980s, there were over 200 suits per year.²⁰⁸ This rise in lawsuits made Congress apprehensive of the fact that increases in liability could cause the vaccine industry to leave the market. As a result, they introduced the NCVIA, which established the National Vaccine Injury Compensation Program (VICP).²⁰⁹

Under this program, a separate court arrangement was created for vaccine manufacturers to address claims regarding vaccine injury and capped all damages. It also allowed the injured party, in return, to seek compensation even without submitting evidence of the offense. This law was meant to provide both parties with the assurance that although vaccines may, in some rare cases, cause injury, they still serve a greater purpose for the public and should have limited liability as well as a path for those who were harmed to have a cost-effective compensation system.²¹⁰

Since the enactment of the NCVIA in 1986, Congress passed a number of amendments through the 21st Century Cures Act (2016) to expand its scope. For instance, the VICP now covers “vaccines recommended by the CDC for routine administration to pregnant women (but not for routine administration in children).”²¹¹ Furthermore, since the amendment, the program has significantly increased the number of claims it compensated. For example, in 2004, only 54 cases received compensation and, in 2006, the government paid \$56 million in costs. Yet in 2017, 706 cases were remunerated and the government paid \$282 million, for which \$25 million was allocated

²⁰⁸ Ibid.

²⁰⁹ Ibid.

²¹⁰ Blake, Valarie. “The National Childhood Vaccine Injury Act and the Supreme Court's Interpretation.”

²¹¹ “About the National Vaccine Injury Compensation Program,” March 2020.
<https://www.hrsa.gov/vaccine-compensation/about/index.html>.

to the legal fees of the petitioners.²¹² Further, “Between 2015 and 2019, 77 percent of claims were compensated.” However, it is estimated that 70 percent of the payments were “the result of a negotiated settlements ‘in which HHS has not concluded, based upon review of the evidence, that the alleged vaccine caused the alleged injury.’”²¹³

Fueled in part by such outcomes, the increase in vaccine hesitancy in the United States coupled with the significant rise in government payouts can have a negative toll on the public perception of vaccines. However, as stated by Dr. Narayan Nair (head of the Vaccine Injury Compensation Program), Dr. Cody Meissner (the chair of pediatric infectious disease at Tufts University School of Medicine), and Dr. Stanley Plotkin (the creator of the rubella vaccine), “although the establishment of the VICP may support some arguments of those who question the safety of vaccines, its existence promotes wide acceptance of vaccination as a public good that is also humane to those who perceive they have been injured by this public good.”²¹⁴

Lastly, autism is not among the list of injuries for which a petitioner may receive compensation. Since the early 2000s, the VICP has received more than 5,000 autism-related claims inspired by the now-rescinded Wakefield study. However, the cases were denied as the link between vaccines and autism has been repeatedly disproven.²¹⁵

In the United States, of the approximately 300 million vaccine doses administered per year, the VICP receives around 500 claims.²¹⁶ To that end, vaccines that are scientifically proven to be safe and effective against pathogens that are otherwise

²¹² Hamblin, James. “Why the Government Pays Billions to People Who Claim Injury by Vaccines.” *The Atlantic*. Atlantic Media Company, May 14, 2019.

<https://www.theatlantic.com/health/archive/2019/05/vaccine-safety-program/589354/>.

²¹³ *Ibid.*

²¹⁴ *Ibid.*

²¹⁵ *Ibid.*

²¹⁶ *Ibid.*

unmanageable and can preemptively save-lives, unlike the flu, Congress should move forward with mandating its distribution.

Legislative Branch vs. Executive Branch

In March 2019, the Senate held a health committee hearing on the role immunizations have in safeguarding the public from vaccine-preventable diseases, such as measles, given the outbreaks taking place across the nation and throughout the world. However, Senator Rand Paul, who is a physician himself and believes the benefits of immunizations outweigh the potential risks, stated that he is not in agreement with “giving up on liberty for a false sense of security.”²¹⁷

As the only Senator in the committee expressing objection to mandatory vaccinations, he was then countered by several other hearing witnesses who commented on the vulnerability communities have faced as a result of the significant decrease in vaccination rates. In particular, Senator and physician Bill Cassidy responded to Paul, "If you're such a believer in liberty that you should not be vaccinated, there should be consequences if you infect others.”²¹⁸ This position requires further examination as it could be part of a comprehensive policy solution. Although there were discussions on how to properly educate the public about immunizations and combat the rhetoric shared by anti-vaccination advocates during the hearing, as of December 2019, movement towards comprehensive immunization legislation has not taken place or been moved to the Senate floor.²¹⁹

²¹⁷ Ehley, Brianna. “Rand Paul Condemns Mandatory Vaccines amid Measles Outbreak.”

²¹⁸ Ibid.

²¹⁹ Ehley, Brianna. “Rand Paul Condemns Mandatory Vaccines amid Measles Outbreak.”

In May 2019, Representative Frederica Wilson of Florida, in an effort to amend the Public Health Service Act of 1944 and require every public school elementary and secondary student in the country to be immunized in alignment with the recommendations of the Advisory Committee on Immunization Practices, introduced Vaccinate All Children Act of 2019.²²⁰ However, as of September 2020, despite having 18 co-sponsors, the bill has not been subject to a vote on the floor of the House of Representatives.

Additionally, in April 2019, Congressman Adam Schiff introduced a resolution in the House entitled *Recognizing the Importance of Vaccinations and Immunizations in the United States*. This resolution lauds the private and public sector as well as the international community for their work in “bolstering health through vaccination,” in addition to recognizing its safety and necessity to address the public health crisis.²²¹ However, similar to the vaccination act proposed by Wilson, despite 34 co-sponsors, no progress has been made on this resolution.

Ideological inconsistencies and a prolonged stalemate within Congress are impeding the legislative branch’s ability to timely and properly act to address vaccine-hesitancy and its threat to public health. As such, the President of the United States, through the privilege of Executive Order, could take decisive action and remove all non-medical exemptions from school-mandated state vaccination laws, as an unprotected public from deadly infectious diseases can pose as a national security threat with no real-time remedy.

²²⁰ United States, Congress, “Vaccinate All Children Act of 2019.”

²²¹ H.R. Con. Res. 179, 116th Cong., (2019).

Historical Use of Executive Orders for Public Health Threats

Although the United States Constitution does not enumerate the establishment of executive orders under Article II, there have been nearly 14,000 of such decrees with only a few related to public health.²²² The precarious nature of these orders is the lack of congressional approval constitutionally required to effectively make the personal will of the President into law. However, an executive order can be “overridden” by Congress through the enactment of new legislation that would impede the action declared. Despite this, the legislation would most likely be met with a presidential veto and then need a two-thirds majority to once again, overrule.²²³ Hence, from 1789 through 2004, Congress has only been able to overturn 7 percent of presidential vetoes.²²⁴

The President of the United States, as Commander and Chief of the Armed Services, holds a constitutional obligation to protect and defend the nation from enemies foreign and domestic. However, as there is a lack of sanction and, therefore, specification of an executive order, the President is not limited in scope to create executive orders whether or not related to national security.

The challenge to national security, in terms of infectious diseases, is that it can only be obtained when nation-states come together to establish international security against these pathogenic threats.²²⁵ This was first realized in 1925 with the creation of the International Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous

²²² History.com Editors. “Executive Order.” History.com. A&E Television Networks, November 17, 2017. <https://www.history.com/topics/us-government/executive-order>; “What Is an Executive Order?” American Bar Association, November 27, 2018. https://www.americanbar.org/groups/public_education/publications/teaching-legal-docs/what-is-an-executive-order/.

²²³ Ibid.

²²⁴ Laviola, Erin. “Can Congress Overturn an Executive Order by the President?” Heavy.com, November 1, 2018. <https://heavy.com/news/2018/10/can-congress-overturn-executive-order/>.

²²⁵ Fidler, David P. “Public health and national security in the global age: infectious diseases, bioterrorism, and realpolitik.” *Geo. Wash. Int’l L. Rev.* 35 (2003): 787.

or other Gases, and of Bacteriological Methods of Warfare.²²⁶ Despite this prohibition, the Geneva Protocol had its limitations. For instance, this ban only applied to the use of bioweapons between states and gave governments the right to use them in-kind as a form of retaliation should another state use this method first.²²⁷

A rare instance under which a United States President issued a public health executive order occurred during the 2014 Ebola outbreak. President Obama, at the time, signed an executive order which supported the Global Health Security Agenda and committed the United States to assist in the prevention, detection, and response of any infectious disease threat.²²⁸ This was reaffirmed in May 2019 by President Trump who emphasized the “whole-government” approach to threats that were either “naturally occurring, accidental, or deliberate” would remain as a policy under his administration.²²⁹

In addition to his support for the Global Health Security Agenda, President Obama amended Executive Order 13295, which allows the Surgeon General to quarantine those with certain communicable diseases, to also include diseases that are likely to cause morbidity or even death.²³⁰ However, applying quarantine measures for measles may not be as efficient as its airborne nature produces rapid contraction rates.

²²⁶ “1925 Geneva Protocol – UNODA.” United Nations. United Nations, February 8, 1928. <https://www.un.org/disarmament/wmd/bio/1925-geneva-protocol/>.

²²⁷ Fidler, David P. “Public health and national security in the global age: infectious diseases, bioterrorism, and realpolitik.”

²²⁸ “Executive Order -- Advancing the Global Health Security Agenda to Achieve a World Safe and Secure from Infectious Disease Threats.” National Archives and Records Administration. November 4, 2016. <https://obamawhitehouse.archives.gov/the-press-office/2016/11/04/executive-order-advancing-global-health-security-agenda-achieve-world>.

²²⁹ “President Donald J. Trump Is Protecting the Homeland and the World from Global Health Security Threats.” The White House. The United States Government, May 9, 2019. <https://www.whitehouse.gov/briefings-statements/president-donald-j-trump-protecting-homeland-world-global-health-security-threats/>.

²³⁰ “Executive Order -- Revised List of Quarantinable Communicable Diseases.” National Archives and Records Administration. July 31, 2014. <https://obamawhitehouse.archives.gov/the-press-office/2014/07/31/executive-order-revised-list-quarantinable-communicable-diseases>.

In September 2019, President Trump issued an executive order which called for the modernization of the influenza vaccine. This disease is of particular concern for the Trump Administration “because a pandemic has the potential to overwhelm or compromise essential government functions, including defense and homeland security, and as such the Government must take action to promote faster and more scalable manufacturing platforms.”²³¹

The current vaccine development process involves the tedious use of chicken eggs, a process that has barely evolved for the past 70 years and limits the ability to secure enough quantity for pandemic control. This executive order was intended to amend the manufacturing and distribution of the flu vaccine as, according to the CDC, only 45 percent of Americans get immunized every year.²³² As such, this order calls for the use and expansion of more innovative solutions which, in turn, could bring longer-lasting vaccines against influenza.

Moreover, on March 13, 2020, President Trump declared the COVID-19 pandemic a national emergency. This declaration was followed by a series of executive orders that, among other actions, enabled the Defense Production Act and prioritized the country’s medical resources to its COVID-19 response.²³³ The conditions under this outcome included a novel disease for which a vaccine was yet developed, the rapid spread of this disease across the country causing, as of this writing, nearly 15 million

²³¹ “Executive Order on Modernizing Influenza Vaccines in the United States to Promote National Security and Public Health.” *The White House*, The United States Government, 19 Sept. 2019, <https://www.whitehouse.gov/presidential-actions/executive-order-modernizing-influenza-vaccines-united-states-promote-national-security-public-health/>.

²³² *Ibid.*

²³³ “Proclamation on Declaring a National Emergency Concerning the Novel Coronavirus Disease (COVID-19) Outbreak.” The White House. The United States Government, March 13, 2020. <https://www.whitehouse.gov/presidential-actions/proclamation-declaring-national-emergency-concerning-novel-coronavirus-disease-covid-19-outbreak/>; “2020 Donald Trump Executive Orders,” 2020. <https://www.federalregister.gov/presidential-documents/executive-orders/donald-trump/2020>.

cases with over 280,000 deaths in the span of almost 9 months, and a strong resistance among a segment of the population to observing the Centers for Disease Control and Prevention (CDC)'s guidelines.²³⁴ Thus, in the context of a declared national emergency, it is reasonable to expect executive action in contemporary politics.

Similar to influenza, measles is contagious, can quickly evolve, and easily spread around the world.²³⁵ It is also nine times more contagious than Ebola.²³⁶ More specifically, for every measles-infected individual, it is estimated that between 12 to 18 people will also contract the virus, while for Ebola, it is estimated that only 2 would be infected.²³⁷ Moreover, the airborne nature of measles has caused more deaths than Ebola in the Democratic Republic of the Congo, which is currently in the midst of battling outbreaks of both diseases as well as COVID-19.²³⁸

Although not all outbreaks result in significant public health events, some do cause serious economic harm. In addition to the medically related costs to the individual, states, and federal government, there may also be critical interruptions to travel and trade leading to even more economic hardship. For instance, due to the 2003 SARS epidemic, the United States lost \$30 million as a result of the reduction in trade, travel, and

²³⁴ "COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU);" Jacobo, Julia. "More than 1 Million People Traveled by Plane in the US in One Day, despite CDC COVID-19 Guidelines." ABC News. ABC News Network, November 22, 2020. <https://abcnews.go.com/US/million-people-traveled-plane-us-day-cdc-covid/story?id=74345950>.

²³⁵ Zimmer, Carl. "How The Measles Virus Became A Master of Contagion." National Geographic, February 5, 2015. <https://www.nationalgeographic.com/science/phenomena/2015/02/05/how-the-measles-virus-became-a-master-of-contagion/>.

²³⁶ Brodwin, Erin. "Here's How Much More Contagious Measles Is than Ebola." *Business Insider*. February 02, 2015. <https://www.businessinsider.com/how-much-more-contagious-is-measles-than-ebola-2015-2>

²³⁷ Zimmer, Carl. "How The Measles Virus Became A Master of Contagion."

²³⁸ Moeti, Dr Matshidiso. "Measles Has Now Killed More People in DRC than Ebola – and Almost All of Them Are Children." The Telegraph. Telegraph Media Group, September 11, 2019. <https://www.telegraph.co.uk/global-health/science-and-disease/measles-has-now-killed-people-drc-ebola-almost-children/>; "New Ebola Outbreak Detected in Northwest Democratic Republic of the Congo; WHO Surge Team Supporting the Response." World Health Organization. World Health Organization, June 1, 2020. <https://www.who.int/news-room/detail/01-06-2020-new-ebola-outbreak-detected-in-northwest-democratic-republic-of-the-congo-who-surge-team-supporting-the-response>.

commerce and due to the recent Zika outbreak it was estimated to have lost another \$0.5-2 billion in just the six Gulf states.²³⁹

However, if the President were to recognize the measles or similar diseases as a threat to the country, the definition of national security would need to be expanded to include infectious diseases. In fact, there have been growing calls to include infectious diseases under the umbrella of national security as it can not only create political instability and pose a threat to the armed services, but it can also have immense negative impacts on the population.²⁴⁰ For instance, outbreaks can cause a dire medical response and, in turn, overwhelm the CDC, public health professionals, hospitals, and medical systems. As such, the well-being or public health security of the American people would be in jeopardy and placed in a precarious position.

Case Study: The European Union and the Anti-Vaccination Movement

In 2019, the total number of reported measles cases reached a pinnacle not seen since 2006, with even half-year figures superseding every annual sum since then. In Europe alone, there have been around 90,000 reported cases from 2018 to mid-2019.²⁴¹

²³⁹ Michaud, Josh, Kellie Moss, and Jennifer Kates. "The U.S. Government and Global Health Security." The Henry J. Kaiser Family Foundation, March 13, 2019. <https://www.kff.org/global-health-policy/issue-brief/the-u-s-government-and-global-health-security/>; Lee, B. Y., Alfaro-Murillo, J. A., Parpia, A. S., Asti, L., Wedlock, P. T., Hotez, P. J., & Galvani, A. P. (2017). The potential economic burden of Zika in the continental United States. *PLoS neglected tropical diseases*, 11(4), e0005531. doi:10.1371/journal.pntd.0005531

²⁴⁰ Peterson, Susan. "Epidemic disease and national security." *Security Studies* 12, no. 2 (2002): 43-81.

²⁴¹ "Vaccination: European Commission and World Health Organization Join Forces to Promote the Benefits of Vaccines." World Health Organization. World Health Organization, September 12, 2019. <https://www.who.int/news-room/detail/12-09-2019-vaccination-european-commission-and-world-health-organization-join-forces-to-promote-the-benefits-of-vaccines>.

This resulted in 33 out of 53 countries in the region losing their measles elimination statuses including Germany, Britain, and France.²⁴²

According to European Union (EU) Health Commissioner Vytenis Andriukaitis, if the anti-vaccination movement continues to gain traction, it will leave the European Union highly vulnerable to pandemics and to threats of bioterrorism. He also believes the anti-vaccination movement has been partially driven by several populist political parties such as the Five Star Movement in Italy and the National Rally in France who have spewed the disproven theory that the MMR vaccine causes autism.²⁴³

In 2017, as a result of accounting for 30 percent of the measles burden within the EU, the Italian government made 10 immunizations compulsory for children in order to attend school.²⁴⁴ However, the Five Star Movement reversed this order when the party took control the following year. In response, the EU health ministers convened later that year to discuss proposals on how to counter the anti-vaccination movement, and in turn, increase the immunization rate within the region. This is imperative because, as Dr. Andriukaitis warned, with the current momentum of the anti-vaccination rhetoric, in about two to three years, “it will be very difficult to guarantee the security of our society.”²⁴⁵

²⁴² Guy, Jack. “Four European Countries Lose Measles-Free Status after Outbreaks.” CNN. Cable News Network, August 29, 2019. <https://www.cnn.com/2019/08/29/health/europe-measles-outbreaks-scli-intl/index.html>; Belluz, Julia. “The Global Crackdown on Parents Who Refuse Vaccines for Their Kids Is On.” Vox. Vox, November 15, 2019b. <https://www.vox.com/science-and-health/2017/8/3/16069204/vaccine-fines-measles-outbreaks-europe-australia>.

²⁴³ Peel, Michael. “EU Warns of Bioterror and Disease Risk as Vaccination Rates Fall.” Financial Times. Financial Times, December 7, 2018. <https://www.ft.com/content/0b8879dc-f97d-11e8-af46-2022a0b02a6c>.

²⁴⁴ Ibid; Pianigiani, Gaia. “Vaccine Law Returns to Force in Italy, Barring 300 Children From Kindergarten.” The New York Times. The New York Times, March 12, 2019. <https://www.nytimes.com/2019/03/12/world/europe/italy-vaccine.html?auth=login-email&login=email>.

²⁴⁵ Peel, Michael. “EU Warns of Bioterror and Disease Risk as Vaccination Rates Fall.”

Some of these proposals included the establishment of databases for emergency vaccine stockpiles, measures on how to curtail disinformation, as well as electronic vaccination cards.²⁴⁶ The vaccination cards would provide authorities in various countries with the ability to review immunization records of EU citizens and survey for disease vulnerabilities. However, this raises privacy concerns.²⁴⁷ Similarly, if the President of the United States were to securitize the mandate of vaccinations, concerns over privacy would be raised as it is unclear how this proposed law would be implemented without medical records being made publicly available to authorized personnel.

Implications of National Security Declaration for Infectious Diseases

In “Epidemic Diseases and National Security,” Susan Peterson makes the distinction between human security and national security where the former focuses on the need to protect the welfare of individuals while the latter reviews threats to institutions and territories. Traditionally, the focus of United States security has been external threats, but when considering the air-borne nature of measles or similar diseases, security should be viewed as both an internal and external threat; especially if the pathogen is likely to be introduced from abroad.²⁴⁸ As CDC Director Tom Frieden noted, “Current outbreaks of measles in the US serve as a reminder that these diseases are only a plane ride away. Borders can’t stop measles, but vaccination can.”²⁴⁹

²⁴⁶ Ibid.

²⁴⁷ Ibid.

²⁴⁸ Peterson, Susan. “Epidemic disease and national security.”

²⁴⁹ “Report Shows 20-Year US Immunization Program Spares Millions of Children from Diseases.” Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, April 24, 2014. <https://www.cdc.gov/media/releases/2014/p0424-immunization-program.html>.

The expansion of the definition of national security to also include infectious diseases as a security threat requires a prepared response for the serious implications this may have on the citizenry and security community. For example, once a more “non-traditional” instance is considered a threat, the barriers of limitation as to what else can be labeled as such is removed.²⁵⁰ It is also unclear as to what exactly is gained by connecting human security to an epidemic disease. Rather than seeking a public health, humanitarian, or development response, a military one may be implied.²⁵¹

When considering declaring the measles outbreak a national security risk, not only should a governmental and potentially military response be considered, but the reaction of the public as well. After the September 11th and anthrax attacks in 2001, a SARS outbreak in China shortly followed in 2003. This SARS epidemic was coupled with a congressional address given by the then-FBI Director Robert Mueller where he expressed the Bureau’s belief that there were several hundred al Qaeda extremists living in the United States.²⁵² Although the Justice Department was only able to link less than a dozen people to this terrorist organization, Mueller continued to persist about this threat. As a result, the “doctrine of evolving threats” was adopted by national security professionals with each threat considered as alarming as 9/11.²⁵³ The national security community, in this case, failed to consider the public impact of such announcements.

However, during the SARS epidemic, the partners in global health worked to contain the epidemic while crucially educating the public and managing their perception

²⁵⁰ Peterson, Susan. "Epidemic disease and national security."

²⁵¹ Ibid.

²⁵² Kurzman, Charles. "What Terrorism Experts Can Learn From Public Health Experts." *Foreign Policy*, September 28, 2019. <https://foreignpolicy.com/2019/09/28/what-terror-experts-can-learn-from-public-health-experts/>.

²⁵³ Ibid.

of the disease. According to the polling at the time of this crisis, a time of already heightened security, the hundreds of deaths caused by SARS and its continued rapid spread made it “a top fear among Americans, surpassing even terrorism in apparent level of concern.”²⁵⁴ As such, the then-director of the CDC had to provide regular updates in an effort to curtail the growing panic. What’s more, public health experts also found themselves in serious conversations of how “to reconcile the tension between the public’s health and individual rights to privacy, liberty, and freedom of movement.”²⁵⁵ Nonetheless, as mentioned by the then-Chief of Staff at York Central Hospital, Richard Schabas, “SARS is a serious problem that needs to be dealt with seriously. Yet our actions must be based on facts and experience, not on fears.” It was, therefore, crucial that the response to this epidemic not be worse than the disease itself.²⁵⁶

There are also financial implications to declaring the measles outbreak or similar infectious diseases as an issue of national security as it could unlock significant supplementary funding for programs such as Vaccines for Children (VFC), which was first established in 1994 to provide children on Medicaid or uninsured with free immunizations.²⁵⁷ This financial support would also help the government to indirectly raise the vaccination threshold levels among communities. While there are currently just over 44,000 doctors who participate in VFC, with increased funding, this program would be able to significantly expand thus ultimately improving herd immunity levels among vulnerable communities.²⁵⁸

²⁵⁴ Kurzman, Charles. “What Terrorism Experts Can Learn From Public Health Experts.”

²⁵⁵ Ibid.

²⁵⁶ Ibid.

²⁵⁷ “VFC | About the Program | Vaccines for Children Program | CDC.” *Centers for Disease Control and Prevention*. February 18, 2016. <https://www.cdc.gov/vaccines/programs/vfc/about/index.html>.

²⁵⁸ Ibid.

In 2014, the CDC conducted a 20-year anniversary report on the VFC program to measure its impact. It found that as a result of the program, more than 21 million hospitalizations and 732,000 deaths were prevented among children born since the inception of the program. What's more, it is estimated that nearly \$295 billion in direct hospitalization costs and \$1.38 trillion in societal costs would be saved.²⁵⁹

Although declaring the measles outbreak a national security threat may provide additional funding to the VFC program and, in turn, increase immunization rates among vulnerable children, this will not reverse the strong sentiments and beliefs shared within the anti-vaccination community. The disinformation that has spread amongst the vaccine-hesitant and resistant has perpetuated an underlying mistrust in the government, which has then extended to medical professionals.²⁶⁰

A partial solution would be to address the disinformation spread at the community level. The CDC, in an effort to circumvent the false rhetoric shared by the anti-vaccination movement, has already provided physicians with resources on how to best communicate with hesitant parents on what is medically known about the measles and the MMR vaccine.²⁶¹ However, as the recent outbreaks have shown, these efforts need to be expanded to save more lives and to minimize the public health crisis.

The role of social media outlets like Facebook in the campaign of medical disinformation must also be addressed as there are security implications surrounding what technology companies choose to monitor. In March 2019, in an effort to impede the spread of disinformation, Facebook launched a new policy regarding anti-vaccination

²⁵⁹ "Report Shows 20-Year US Immunization Program Spares Millions of Children from Diseases."

²⁶⁰ Garrett, Laurie. "The World's Many Measles Conspiracies Are All the Same."

²⁶¹ "CDC Telebriefing: National Update on Measles Transcript | CDC Online Newsroom | CDC." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, April 29, 2019. <https://www.cdc.gov/media/releases/2019/t0429-national-update-measles.html>.

content, which offers its users the ability to reject advertisements that may be false.

Nonetheless, active measures to prevent people from publishing such content will not be undertaken. Rather, Facebook's algorithm will work to prevent false stories from gaining traction.²⁶² Although this is a start, it is unclear whether this would be a sufficient solution.

Conclusion

The World Health Organization has declared vaccine hesitancy one of the top ten global threats of 2019 next to Ebola, HIV, and climate change.²⁶³ This global threat has, to a large degree, led to the recent rise in measles cases throughout the United States and around the world. The measles, in particular, is among one of the most infectious diseases in the world and has no cure.²⁶⁴ Approximately 6 million people are diagnosed with this disease every year and it is the cause of death of nearly 400 children a day.²⁶⁵ As such, the measles should be specifically identified as a target disease under the Global Health Security Agenda.

Despite all the available research and warnings, in the United States, there are only five states that have taken active measures to not allow religious or philosophical exemptions for school-required immunizations. Additionally, Congress has not moved forward in passing legislation that would require its constituents to enter this social

²⁶² Nuñez, Michael. "Mark Zuckerberg's Answer To An Anti-Vaxxer Question Highlights Facebook's Problematic Response To Misinformation." *Forbes*. Forbes Magazine, October 23, 2019. <https://www.forbes.com/sites/mnunez/2019/10/23/mark-zuckerbergs-answer-to-an-anti-vaxxer-question-highlights-facebooks-problematic-response-to-misinformation/#7a86056e70b7>.

²⁶³ "Ten Health Issues WHO Will Tackle This Year." World Health Organization. 2019. <https://www.who.int/emergencies/ten-threats-to-global-health-in-2019>.

²⁶⁴ "Measles." World Health Organization. May 9, 2019. <https://www.who.int/news-room/fact-sheets/detail/measles>.

²⁶⁵ Magra, Iliana. "Over 20 Million Children a Year Miss Out on First Dose of Measles Vaccine."

contract. As such, a presidential executive order removing all non-medical exemptions may be the remaining measure to preempt a public health emergency. However, declaring infectious diseases to be a national security threat may result in undue consequences such as the militarization of vaccine administration.

As the world continues to battle the rise of re-emerging diseases that were once considered eliminated in several countries, the security implications of disinformation must be addressed. For decades, the internet has proven to be a powerful tool that has allowed individuals to thrive and to easily access information which may otherwise be too costly or unattainable. The internet has also remained largely unregulated for which its filtration will not only impede the freedom to access reliable information but would also lead governments down an extremely precarious path. Therefore, given these challenges, it would be more optimal for Congress create legislation that would remove non-medical exemptions and for the President to pursue a solution to address disinformation, especially as it relates to infectious diseases. This could be accomplished by the government uniting the public and private sectors in discussion on how the circulation of consequential disinformation can be reduced whilst maintaining the freedom of the internet. However, it is unclear whether this and similar efforts will be enough to combat diseases that know no boundaries.

Chapter 3: The creation of monetary immunization incentives

Introduction

In 1962, the federal government established the Vaccine Assistance Act in order to emend the discrepancy in immunization coverage experienced between economic classes and further protect the nation against diseases such as whooping cough and polio. The following year, the measles vaccine was discovered and included in the Act, which resulted in an estimated 15 million children being immunized against this virus in its first three years of production.²⁶⁶ Although the number of measles cases significantly declined as a result, an alarming number of parents are now utilizing non-medical vaccination exemptions for their children, which has caused several outbreaks to occur across the country.²⁶⁷ If the federal government is unable to remove non-medical vaccination exemptions, it should create and support monetary incentive programs for immunizations proven effective for at least ten years with few to no side effects, such as the measles, mumps, and rubella (MMR) vaccine, in order to re-establish the herd immunity rates needed to protect its citizens. This more voluntary method may motivate additional participation in vaccination administrations and will ensure the power to legislate remains with the people's branch rather than the growing executive office. This paper will briefly discuss the historic and current landscape of the vaccination crisis in the United States and will highlight the advantages and disadvantages of immunization incentive programs,

²⁶⁶ Hendriks, Jan, and Stuart Blume. "Measles Vaccination before the Measles-Mumps-Rubella Vaccine." American journal of public health. American Public Health Association, August 2013. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4007870/>.

²⁶⁷ Ibid; Bednarczyk, Robert A., Adrian R. King, Ariana Lahijani, and Saad B. Omer. "Current landscape of nonmedical vaccination exemptions in the United States: impact of policy changes." *Expert review of vaccines* 18, no. 2 (2019): 175-190.

using Australia as a case study. Finally, strategies to combat vaccine hesitancy will also be discussed.

Since the first written accounts in the ninth century, measles has infected millions of people and caused many deaths worldwide.²⁶⁸ Victims who survive its devastation can be faced with life-long internal scars: from a destroyed immune system to potential deafness and physiological impairment.²⁶⁹ However, in 1963 a medical breakthrough occurred with the creation and licensing of the first vaccine against this potentially deadly virus. This single discovery later changed the trajectory of future generations around the world.²⁷⁰

The first measles vaccine was created by John Enders and colleagues after almost ten years of research and trials. However, the version of the vaccine used today took an additional five years to develop by Maurice Hilleman and colleagues. It is often integrated with the mumps and rubella vaccine, thus collectively forming the MMR vaccine.²⁷¹ Through the combined efforts of state and federal governments, in 2000, the United States was able to eliminate measles as a public health threat.²⁷² However, as the number of measles cases declined, so did the number of individuals being vaccinated against this virus, thus creating another problem.

²⁶⁸ “Measles,” February 5, 2018. <https://www.cdc.gov/measles/about/history.html>.

²⁶⁹ Gallagher, James. “Measles Makes Body 'Forget' How to Fight Infection,” October 31, 2019. <https://www.bbc.com/news/health-50251259>. “Measles Complications.” Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, June 13, 2019. <https://www.cdc.gov/measles/symptoms/complications.html>; Cookson, Clive. “Childhood Measles Has Lasting Effects, Study Shows.” Financial Times. October 31, 2019. <https://www.ft.com/content/53d47c5c-fb09-11e9-a354-36acbbb0d9b6>; “Vaccine for Measles (MMR Shot).” Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, June 13, 2019. <https://www.cdc.gov/measles/vaccination.html>.

²⁷⁰ Hendriks, Jan, and Stuart Blume. “Measles Vaccination before the Measles-Mumps-Rubella Vaccine.”

²⁷¹ Ibid.

²⁷² Ibid; “Measles | History of Measles | CDC.” Centers for Disease Control and Prevention.

The significant decline in MMR vaccination rates is due to a variety of factors, such as the generational gap between the measles epidemic experienced in the 1900s and the not-as-evident number of cases seen today, and the disinformation published about vaccines and in particular the MMR vaccine. These factors have given rise to the contemporary anti-vaccination movement.²⁷³

Moreover, many children in the United States are not able to access this life-saving immunization due to their socioeconomic status and lack of health insurance. There is also another vulnerable segment of the population who are medically ineligible to receive inoculations such as cancer patients and, therefore, rely on herd immunity to avoid infection. However, the ongoing COVID-19 pandemic has only added to and accelerated its existing challenges as parents have become less inclined to bring their children to doctors' offices to receive the measles vaccines.²⁷⁴

The Vaccine Assistance Act

Upon the approval of the measles vaccine by the Food and Drug Administration, the medical community embarked on educating and persuading families to immunize their children. Although the measles infected almost every child prior to the age of 15, the cost of the vaccine was a significant barrier for families to overcome. During the 1960s, one dose of the measles vaccine cost approximately \$10, or \$82 present-day.²⁷⁵

²⁷³ Haelle, Tara. "Why It Took So Long to Eliminate Measles." History.com. A&E Television Networks, February 6, 2019. <https://www.history.com/news/measles-vaccine-disease>; Rao, T S Sathyanarayana, and Chittaranjan Andrade. "The MMR Vaccine and Autism: Sensation, Refutation, Retraction, and Fraud." Indian journal of psychiatry. Medknow Publications, April 2011. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3136032/>.

²⁷⁴ Waldstein, David. "Vaccinations Fall to Alarming Rates, C.D.C. Study Shows." The New York Times. The New York Times, May 18, 2020. <https://www.nytimes.com/2020/05/18/health/vaccinations-rates-coronavirus.html>.

²⁷⁵ Ibid.

This financial burden had a greater impact on lower-income communities where disparities in coverage and the apparent rise in measles cases continued.²⁷⁶

The ongoing disparity in vaccination coverage was evident prior to the creation of the measles vaccine. In response, Congress created the Vaccine Assistance Act in 1962 to provide states with the funds needed to distribute vaccinations against whooping cough, polio, tetanus, and diphtheria for its residents.²⁷⁷ Due to the timing, given the first measles vaccine was created a year after the Act's implementation, measles was not initially included. However, upon the renewal of the Act, an amendment was added to ensure federal financial assistance against this potentially deadly, yet vaccine-preventable virus.²⁷⁸ Through this program, from 1963 to 1966, an estimated 15 million children were able to get access to this vaccine. This resulted in a 50 percent drop in the number of reported measles cases.²⁷⁹

President Lyndon Johnson's War on Poverty also advocated for the increase in access to vaccines for lower-income households and was at the forefront of the creation of Medicaid and the Early and Periodic Screening, Diagnosis and Treatment benefit, which were meant to provide children with access to preventative care, such as immunizations.²⁸⁰ This success led to the national campaign, pioneered in 1967, to eliminate measles in the United States. In the first year of this initiative, around 11.7

²⁷⁶ Hendriks, Jan, and Stuart Blume. "Measles Vaccination before the Measles-Mumps-Rubella Vaccine."

²⁷⁷ Ibid.

²⁷⁸ Ibid.

²⁷⁹ Ibid.

²⁸⁰ Colgrove, James. "Immunity for the People: the Challenge of Achieving High Vaccine Coverage in American History." Public health reports (Washington, D.C. : 1974). Association of Schools of Public Health, April 2007. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1820430/>.

million measles vaccines were administered with the number of reported cases significantly declining from 900,000 to 250,000.²⁸¹

However, despite its success and due to budgetary cuts, Congress removed federal funding for community vaccination strategies for fiscal years 1969 and 1970.

Subsequently, the number of vaccines administered dropped by 2.3 million causing measles cases to rise from 533,000 to 847,000 within one year. This exponential increase led Congress to re-authorize funding towards these programs causing the number of cases to fall to 400,000 the following year.²⁸² It is through this highly visible fluctuation in case numbers that the rudimentary nature of vaccines on the health outcomes of the population becomes evident.

By 1970, in line with the statistics and in order to increase coverage and break transmission among school-age children, 29 states required students to be immunized against particular diseases prior to school entry. In 1977, the federal government continued its push for compulsory vaccination laws as then-Secretary Joseph Califano of the Department of Health and Human Services implored each state governor to take this action.²⁸³ The Centers for Disease Control and Prevention (CDC) also promoted this requirement for school entry and had states review their vaccination laws prior to obtaining federal assistance to purchase vaccines. By 1980, every state adopted mandatory immunizations policies for school entry, which proved to reduce the presence of vaccine-preventable diseases and/or improve vaccine coverage.²⁸⁴

²⁸¹ Hendriks, Jan, and Stuart Blume. "Measles Vaccination before the Measles-Mumps-Rubella Vaccine."

²⁸² Ibid.

²⁸³ Salmon, Daniel A, Stephen P Teret, C Raina MacIntyre, David Salisbury, Margaret A Burgess, and Neal A Halsey. "Compulsory Vaccination and Conscientious or Philosophical Exemptions: Past, Present, and Future." *The Lancet*. Elsevier, February 2, 2006.

<https://www.sciencedirect.com/science/article/pii/S0140673606681440>.

²⁸⁴ Ibid.

The Rise of Non-Medical Vaccination Exemptions

State legislatures across the country have consistently permitted medical vaccination exemptions for those who are immunocompromised. However, over time, 48 states expanded exemptions to include religious and philosophical objections.²⁸⁵ Due to the intricacy involved in acquiring a state exemption, 19 states did not experience a high volume of fulfilled requests compared to states with less to no stringent complex regulations and enforcement policies. In fact, some lax states did not even require parents to speak with a medical professional before granting exemptions.²⁸⁶

Although students with vaccine exemptions from 1985 to 1992 were on average “35 times more likely to contract measles than were vaccinated persons,” these exemptions remained and were further advocated by anti-vaccination groups.²⁸⁷ Several states, in view of the evidence, tried to refrain from allowing philosophical exemptions. However, there are currently 15 states which allow exemptions based on philosophical beliefs.²⁸⁸

The more recent rise in non-medical exemptions was in part due to the 1998 public release of a study by Andrew Wakefield and colleagues where they allege the MMR vaccine increases the predisposition of children to develop mental disorders such

²⁸⁵ Ibid.

²⁸⁶ Ibid.

²⁸⁷ Daniel A. Salmon, MPH. “Health Consequences of Religious and Philosophical Exemptions From Immunization Laws.” JAMA. American Medical Association, July 7, 1999. <https://jamanetwork.com/journals/jama/article-abstract/190649>; Salmon, Daniel A, Stephen P Teret, C Raina MacIntyre, David Salisbury, Margaret A Burgess, and Neal A Halsey. “Compulsory Vaccination and Conscientious or Philosophical Exemptions: Past, Present, and Future.”

²⁸⁸ Salmon, Daniel A, Stephen P Teret, C Raina MacIntyre, David Salisbury, Margaret A Burgess, and Neal A Halsey. “Compulsory Vaccination and Conscientious or Philosophical Exemptions: Past, Present, and Future,” Erik Skinner, Alise Garcia. States With Religious and Philosophical Exemptions From School Immunization Requirements. National Conference of State Legislatures, June 6, 2020. <https://www.ncsl.org/research/health/school-immunization-exemption-state-laws.aspx>.

as autism. While this study was scientifically disproven and redacted due to fraudulent activity, it had already been circulated worldwide for 12 years. As a result of this study, the number of MMR vaccine administrations began to steadily decline as parents became apprehensive about the alleged increased risk of their child developing autism.²⁸⁹ As of today, this false narrative continues to be a driving force behind the anti-vaccination movement and causing untold damage.

In 2019, this rise in vaccine-hesitancy and resistance resulted in over 1,280 cases reported in the United States constituting the largest measles outbreak in 25 years.²⁹⁰ Further, this trend led the World Health Organization (WHO) to classify vaccine hesitancy as one of the top ten global health threats of 2019, alongside Ebola, HIV, and climate change.²⁹¹

In addition to the rise of vaccination exemptions for school-age children, another important reason for low vaccine administration rates in the United States is the lack of access to healthcare among children of lower socioeconomic backgrounds. According to the CDC, in 2017, only 75 percent of children between 19 and 35 months and without health insurance received at least one dose of the MMR vaccine, juxtaposed to 94 percent of children with private health insurance and 90 percent with Medicaid.²⁹²

²⁸⁹ Rao, T. S Sathyanarayana, and Chittaranjan Andrade. "The MMR Vaccine and Autism: Sensation, Refutation, Retraction, and Fraud"

²⁹⁰ Hoffman, Jan. "Millions of Children Are at Risk for Measles as Coronavirus Fears Halt Vaccines." The New York Times. The New York Times, April 14, 2020. <https://www.nytimes.com/2020/04/13/health/coronavirus-measles-vaccines.html>.

²⁹¹ "Ten Health Issues WHO Will Tackle This Year." World Health Organization. 2019. <https://www.who.int/emergencies/ten-threats-to-global-health-in-2019>

²⁹² Simmons-Duffin, Selena. "The Other Reasons Kids Aren't Getting Vaccinations: Poverty And Health Care Access." NPR. NPR, May 20, 2019. <https://www.npr.org/sections/health-shots/2019/05/20/724468630/the-other-reasons-kids-arent-getting-vaccinations-poverty-and-health-care-access>.

The federal government has invested in opportunities for children to receive these vaccines while working to ensure a lack of access to insurance does not become a barrier to health. To this end, the Vaccines for Children program was developed in the 1990s to enable children on Medicaid or uninsured children to receive free immunizations.²⁹³

However, in a 2016 CDC study examining what factors may prevent poor children from adhering to recommended vaccination schedules, it was determined children following these recommendations "tended to live in households with fewer children, higher incomes and less mobility, compared to children who were not."²⁹⁴ Meaning, vaccinations may not be a significant priority for parents with limited time capacity. This outcome is further worsened in 2020 as the nation faces the COVID-19 pandemic, which inevitably will adversely impact the MMR vaccination rates among children.

Impact of the COVID-19 Pandemic on Vaccination Rates

As of August 2020, the United States has only confirmed 7 new cases of measles.²⁹⁵ However, this outcome could be largely due to the fallout from the novel coronavirus pandemic the country and the world have been enduring since early March of this year. In response to this unique threat posed by COVID-19, states across the country issued various extents of stay-at-home orders, and schools were forced to shift from in-

²⁹³ "VFC | About the Program | Vaccines for Children Program | CDC." Centers for Disease Control and Prevention. February 18, 2016. <https://www.cdc.gov/vaccines/programs/vfc/about/index.html>.

²⁹⁴ Simmons-Duffin, Selena. "The Other Reasons Kids Aren't Getting Vaccinations: Poverty And Health Care Access."

²⁹⁵ "Measles Cases and Outbreaks." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, August 19, 2020. <https://www.cdc.gov/measles/cases-outbreaks.html>.

person education to a virtual venue.²⁹⁶ These measures meant there were no mass gatherings, thus reducing the instances for possible transmission.²⁹⁷ This response along with other COVID-19 preventative measures, such as wearing masks and social distancing, likely helped to lower rates of infection especially given the airborne nature of the measles virus as it can remain in the air for up to 2 hours after exposure.²⁹⁸ Moreover, since many measles outbreaks were introduced from abroad, the significant halt in travel due to the pandemic likely helped to further limit infection rates. These cumulative measures particularly helped the vulnerable and under-vaccinated populations.²⁹⁹

Nonetheless, while families remained at home, the rate of recommended childhood immunizations, such as the MMR vaccine, significantly decreased as parents were disinclined to make medical appointments in fear of inadvertently contracting COVID-19 at the doctor's office. According to the CDC, for instance, the vaccination rates in Michigan severely dropped for children 2 years old and under and for infants 5 months or younger as less than half were immunized in May.³⁰⁰ Comparatively, in May 2016 through 2019, approximately two-thirds of children in the same age range were receiving vaccines. However, that number has dropped to 49.7 percent in 2020. This decline is further pronounced among children on Medicaid as only 34.6 percent were on schedule with their vaccinations, juxtaposed to 55 percent of children who are not on government assistance.³⁰¹

²⁹⁶ "Timing of State and Territorial COVID-19 Stay-at-Home Orders and Changes in Population Movement - United States, March 1–May 31, 2020." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, September 4, 2020. <https://www.cdc.gov/mmwr/volumes/69/wr/mm6935a2.htm>.

²⁹⁷ Hoffman, Jan. "Millions of Children Are at Risk for Measles as Coronavirus Fears Halt Vaccines."

²⁹⁸ "Measles, Mumps, and Rubella Vaccines." Smithsonian Institution, n.d. <https://www.si.edu/spotlight/antibody-initiative/mmr>.

²⁹⁹ Hoffman, Jan. "Millions of Children Are at Risk for Measles as Coronavirus Fears Halt Vaccines."

³⁰⁰ Waldstein, David. "Vaccinations Fall to Alarming Rates, C.D.C. Study Shows."

³⁰¹ Ibid.

In Massachusetts, the health department noted that in comparison to the year prior, doses had decreased by 68 percent in the first half of April 2020. In Minnesota, the number of MMR vaccine administrations was down by 71 percent by the end of March 2020. This same trend was also largely observed in the Vaccines for Children program where, since March, the number of vaccines distributed has severely declined.³⁰²

As states continue to manage the spread of COVID-19, the country faces the added danger of a potential resurgence in vaccine-preventable diseases. The Michigan Care Improvement Registry, an organization that reviews the vaccines administered throughout their state, shared recommendations on how to increase immunizations and reinstall trust with parents who fear exposure to COVID-19 in medical facilities. These strategies include assigning exam rooms for healthy children only and providing vaccinations in parking lots.³⁰³ Nonetheless, such efforts may not prove to be enough of an incentive for parents to ensure children adhere to their vaccination schedules including the crucial MMR vaccine.

Monetary Vaccine Incentive Programs

Prior to the 1960s, the financial cost of vaccines was the main barrier families faced to immunizations. In recognizing this financial burden and the powerful positive impact of vaccines on public health, the federal government created and supported free immunization programs such as the Vaccine Assistance Act and Vaccines for Children. In addition, each state established its own vaccine requirements for students to attend

³⁰² Hoffman, Jan. "Vaccine Rates Drop Dangerously as Parents Avoid Doctor's Visits." The New York Times. The New York Times, April 23, 2020. <https://www.nytimes.com/2020/04/23/health/coronavirus-measles-vaccines.html>.

³⁰³ Waldstein, David. "Vaccinations Fall to Alarming Rates, C.D.C. Study Shows."

school in an effort to motivate parents to immunize their children. By 2000, these cumulative efforts led the United States to declare the measles eliminated within its borders.³⁰⁴

However, states became complacent as reported cases of measles declined. 48 states began to introduce religious and philosophical exemptions.³⁰⁵ The nation also faced and continues to face additional barriers, such as the COVID-19 pandemic, to maintain the necessary vaccination rate threshold of 95 percent for herd immunity.³⁰⁶ As such, if the federal government cannot enact compulsory vaccine laws for the MMR vaccine, then it should create vaccine financial incentive programs to help ensure compliance with immunization schedules.

Case Study: The Australian Model and Monetary Vaccine Incentive Programs

In 1997, the Australian government launched an immunization initiative to achieve more than 90 percent coverage among its population. Similar to the United States, in Australia, it is the states that determine which immunizations are required for school admission. However, it is the Australian federal government that provides monetary incentives for parents and doctors to ensure children are protected against vaccine-preventable diseases.³⁰⁷ One such strategy includes the Family Assistance Act

³⁰⁴ Haelle, Tara. "Why It Took So Long to Eliminate Measles."

³⁰⁵ Salmon, Daniel A, Stephen P Teret, C Raina MacIntyre, David Salisbury, Margaret A Burgess, and Neal A Halsey. "Compulsory Vaccination and Conscientious or Philosophical Exemptions: Past, Present, and Future."

³⁰⁶ Andre, FE, R. Booy, HL Bock, J. Clemens, SK Datta, TJ John, RW Lee, S. Lolekha, H. Peltola, TA Ruff, M. Santosham, and HJ Schmitt. "Vaccination Greatly Reduces Disease, Disability, Death and Inequity Worldwide." *World Health Organization*. March 04, 2011. <https://www.who.int/bulletin/volumes/86/2/07-040089/en/>.

³⁰⁷ Salmon, Daniel A, Stephen P Teret, C Raina MacIntyre, David Salisbury, Margaret A Burgess, and Neal A Halsey. "Compulsory Vaccination and Conscientious or Philosophical Exemptions: Past, Present, and Future."

which “provides means-tested maternity allowance and universal child-care benefits, contingent on proof of vaccination.” However, it also allows families to receive the payment “if a recognized immunization provider has certified in writing that he or she has discussed with the adult the benefits and risks of immunizing the child and the adult has declared in writing that he or she has a conscientious exemption to the child being immunized.”³⁰⁸

The Family Assistance Act provides parents with two payments that are contingent upon immunizations.³⁰⁹ The first payment of AU\$750 is provided at birth and the means-tested Maternity Immunization Allowance of an additional AU\$200 is provided once the child is 18 to 24 months old and has received all their vaccinations prior to the 18-month mark.³¹⁰ The parents may still be eligible for this allowance if they provide a philosophical or medical exemption. While this program is meant for parents who meet the financial eligibility requirements, it is found that about 75 percent of families in Australia meet the threshold needed to participate in the program.³¹¹

As a result of this financial incentive, the country’s coverage for vaccinations required by 12 months old increased from 75 percent in 1997 to 94 percent in 2001. This significant increase in vaccinations is also in part due to the creation of the “Australian Childhood Immunization Register (ACIR) and the General Practice Immunization Incentive (GPII).”³¹² The ACIR is a national immunization database that holds the vaccine records of 99 percent of children under the age of 7. It is where doctors provide

³⁰⁸ Ibid.

³⁰⁹ Ibid.

³¹⁰ Lawrence, Glenda L., C.Raina MacIntyre, Brynley P. Hull, and Peter B. McIntyre. “Effectiveness of the Linkage of Child Care and Maternity Payments to Childhood Immunisation.” *Vaccine*. Elsevier, December 12, 2003. <https://www.sciencedirect.com/science/article/pii/S0264410X03008363>.

³¹¹ Ibid.

³¹² Ibid.

updates on the number of vaccines administered as they were also financially incentivized to reach their immunization targets through the GPII.³¹³

According to Lawrance et. al. (2004), not only was parental knowledge of the vaccine financial incentive program associated with the increase in immunizations, but the encouragement shared by their providers also proved to be an important aspect of parental decision-making. However, it was also noted that additional efforts to enhance access to vaccine services for children of lower-income households were still needed. These improved services included potential home visits, which could prove useful during the ongoing COVID-19 pandemic.³¹⁴

Further, to combat vaccine hesitancy in 2016 the Australian government introduced its “No Jab, No Pay” and “No Jab, No Play” policies. The former requires that each child be fully vaccinated in order for parents to receive certain financial assistance and the latter to receive an entry to childcare and kindergarten.³¹⁵ These policies do not allow non-medical exemptions. Although a formal review on the specific impact of these policies on the country’s vaccine rates has not yet occurred, coverage has increased since its implementation.³¹⁶

As such, a study was conducted by Armiento et. al. (2020) to survey “the association between motivation by policies, vaccine hesitancy and intent to seek medical exemption, with vaccine-uptake.”³¹⁷ This research concluded such policies do prompt

³¹³ Ibid.

³¹⁴ Ibid.

³¹⁵ Armiento, Raffaella, Monsurul Hoq, Eugene Kua, Nigel Crawford, Kirsten P. Perrett, Sonja Elia, and Margie Danchin. “Impact of Australian Mandatory ‘No Jab, No Pay’ and ‘No Jab, No Play’ Immunisation Policies on Immunisation Services, Parental Attitudes to Vaccination and Vaccine Uptake, in a Tertiary Paediatric Hospital, the Royal Children’s Hospital, Melbourne.” *Vaccine*. Elsevier, June 17, 2020. <https://www.sciencedirect.com/science/article/pii/S0264410X20307611>.

³¹⁶ Ibid.

³¹⁷ Ibid.

families to have their children immunized. However, it was also evident that only half of the vaccine-hesitant parents, the target audience these policies are trying to reach, were planning on vaccinating their children, with some seeking medical exemptions.³¹⁸

This strategy has caused concern that parents may pressure doctors for medical exemptions despite not meeting the qualifications. This instance occurred in Victoria, which resulted in the government adding more sanctions to the “No Jab, No Play” policy. That is, rather than requiring a letter from a medical professional confirming the immunization status of the child, a certificate from the ACIR must be presented.³¹⁹

A similar case occurred in California when the state first removed its philosophical vaccine exemptions following the severe 2014 measles outbreak that started in Disneyland.³²⁰ California uncovered that a substantial number of the exemptions were being made by unqualified medical practitioners such as dermatologists and cardiologists.³²¹

However, in order to address the growth in vaccine hesitancy and the accompanying declining rates of immunizations, the United States should not enact a parallel policy to “No Jab, No Pay.” This policy unintentionally became a disincentive and disproportionately impacted families of lower-income households who are dependent upon financial government assistance.³²² Rather, the federal government should create

³¹⁸ Ibid.

³¹⁹ Ibid.

³²⁰ Haele, Tara. “California Vaccination Bill SB 277 Signed By Governor, Becomes Law.” *Forbes*. *Forbes Magazine*, June 30, 2015. <https://www.forbes.com/sites/tarahaele/2015/06/30/california-vaccination-bill-sb-277-signed-by-governor-becomes-law/>.

³²¹ Kaplan, Karen. “Here's What Happened after California Got Rid of Personal Belief Exemptions for Childhood Vaccines.” *Los Angeles Times*. *Los Angeles Times*, October 29, 2018. <https://www.latimes.com/science/sciencenow/la-sci-sn-vaccine-medical-exemptions-20181029-story.html>.

³²² Armiento, Raffaella, Monsurul Hoq, Eugene Kua, Nigel Crawford, Kirsten P. Perrett, Sonja Elia, and Margie Danchin. “Impact of Australian Mandatory 'No Jab, No Pay' and 'No Jab, No Play' Immunisation

more efficient immunization incentives, such as the Family Assistance Act, where families are directly financially compensated for having the MMR vaccine administered. This could be in the form of an additional cash benefit as the Act stipulates or a tax credit, which either way could provide families with needed and more timely financial assistance.

Similar to Australia, this would involve the establishment of a national immunization database that can track and synthesize the number of immunizations children have received. Currently, the states have their own individual platforms that keep records of each child's immunization status for school entry and reminder purposes. However, these databases oftentimes do not have complete information and are not compatible with one another.³²³ They would also need to be centralized to be efficient and for the federal government to obtain the necessary information as evidence these vaccines have been administered, and thus approve the distribution of the earned incentives with confidence that each child has been immunized against the measles.

Moreover, state and federal governments need to expand access to facilities or clinics, especially for communities in medical deserts, as collectively they can help increase the country's vaccination coverage. A similar strategy was implemented in Canada.³²⁴ However, despite the monetary incentives and reduced distance needed to visit a medical practitioner, this policy does not guarantee that vaccine-hesitant and resistant parents will allow their children to be immunized against the measles or any

Policies on Immunisation Services, Parental Attitudes to Vaccination and Vaccine Uptake, in a Tertiary Paediatric Hospital, the Royal Children's Hospital, Melbourne.”

³²³ Scutti, Susan. “How Countries around the World Try to Encourage Vaccination.” CNN. Cable News Network, January 2, 2018. <https://www.cnn.com/2017/06/06/health/vaccine-uptake-incentives/index.html>.

³²⁴ Ibid.

other disease. Therefore, additional programs in order to help combat the proliferation of disinformation regarding life-saving vaccines will need to be explored and implemented.

Strategies to Combat Vaccine Hesitancy

The Australian model highlights how monetary vaccine incentive programs for parents had advantages and disadvantages. However, in order to overcome vaccine hesitancy, it is critical the government invests in public health education campaigns where community leaders such as teachers and doctors are at the forefront advocating for the administration of these life-saving vaccines.³²⁵ According to Dr. Tim Lahey from the Dartmouth Institute for Health Policy and Clinical Practice, there is surfacing data that notes if just one individual from one's social circle speaks about vaccines as "a social norm, that does seem to encourage people to be more likely to get vaccination."³²⁶

In addition, Dr. Noel T. Brewer, from the Gillings School of Global Public Health at the University of North Carolina, found through his research that a majority of parents only want to know whether their provider recommends the vaccination.³²⁷ It is imperative, therefore, that doctors stress the safety and health benefits of the measles vaccine, as well as the effects of the disease itself. This includes discussing its history in the United States, explanation of its proliferation abroad and how it is then spread to vulnerable communities domestically, the significant contraction rate of 90 percent

³²⁵ Mastroianni, Brian. "Measles in America: What Life Was Like Before and After the Vaccine." Healthline, March 6, 2019. <https://www.healthline.com/health-news/life-before-and-after-the-measles-vaccine#How-do-you-push-back-effectively-against-this-kind-of-language?->.

³²⁶ Scutti, Susan. "How Countries around the World Try to Encourage Vaccination."

³²⁷ Ibid.

should a person not immunized be exposed to the virus, its symptoms, and most importantly, its potentially life-long, if not deadly, complications.³²⁸

The related complications that may emerge from measles are severe and have the potential to indefinitely alter the quality of life of the patient. It is thus important for doctors to share the consequences and statistics related to the health risks of not getting vaccinated.

For instance, according to the CDC, 1 in 5 of those unvaccinated and infected with measles are hospitalized. In addition, “as many as 1 out of every 20 children with measles gets pneumonia, the most common cause of death from measles in young children.”³²⁹ Furthermore, approximately 1 in every 1,000 children develop encephalitis or brain swelling, which “can lead to convulsions and leave the child deaf or with intellectual disability.” And lastly, almost 1 to 3 out of every 1,000 children will pass away from neurologic and respiratory complications as a result of contracting the measles. These consequences are more commonly seen in children under 5 years old and those 20 years or older, as well as pregnant women and the immunocompromised such as cancer patients.³³⁰

The Australian model could be specifically applied to combat the vaccine hesitancy that inevitably leads to the above statistics. There, doctors were also incentivized to administer vaccinations through the GPII program and to update the national immunization registry with the necessary information. The program not only led to an increase in administrations but it also encouraged and allowed nurses to be trained

³²⁸ “Transmission of Measles.” Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, February 5, 2018. <https://www.cdc.gov/measles/transmission.html>.

³²⁹ “Measles Complications.” Centers for Disease Control and Prevention.

³³⁰ Ibid.

on how to deliver the immunizations, thus developing an added skill.³³¹ If the United States were to create a similar national database system to aid in a monetary vaccine incentive, it could also provide medical professionals with a premium for administering the MMR vaccine.

This approach may prove highly effective in motivating doctors to administer a greater number of inoculations. Unlike the opioid crisis where many doctors were motivated to prescribe specific medications in return for additional compensation from pharmaceutical companies, in terms of the MMR vaccine, doctors administer between one to two doses per patient. The former is proven to be 93 percent effective against the measles while the latter is 97 percent effective.³³² Doctors could be strictly compensated for applying the first dose of MMR.

American exceptionalism and vaccine incentives

Liberty, individualism, egalitarianism, and populism have been longstanding pillars of American exceptionalism. However, these traditions have inspired a culture of embedded wariness in government. Although monetary incentives give citizens the choice of whether or not to vaccinate their children, it may still be a cause of concern for vaccine-hesitant parents as it can appear that the government needs to convince its citizens to get immunized because it may be compromised in some capacity and they are not being fully transparent with the public. In order to combat this skepticism, the

³³¹ Scutti, Susan. “How Countries around the World Try to Encourage Vaccination.”

³³² DeWeerd, Sarah. “Tracing the US Opioid Crisis to Its Roots.” Nature News. Nature Publishing Group, September 11, 2019. <https://www.nature.com/articles/d41586-019-02686-2>; “Vaccine for Measles (MMR Shot).” Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, June 13, 2019. <https://www.cdc.gov/measles/vaccination.html>.

government must account for these notions by framing the discussion around vaccines and vaccine initiatives with these cultural identities.

According to the Moral Foundations Theory, there are 6 values that cause an emotional response in people and thus, drive their decision-making. These foundations include care/harm, liberty/oppression, and purity/degradation. The care/harm foundation relates to protecting and considering others, liberty/oppression involves having a high regard for civil liberties and freedoms, and purity/degradation upholds “sanctity” and disapproves actions deemed “unnatural.”³³³

It was discovered that parents with medium-to-high vaccine hesitancy are often driven by the purity/degradation and liberty/oppression foundations in their decision-making.³³⁴ As such, in promoting a monetary vaccination incentive program, the government must frame its messaging around these values. For instance, the messaging around the purity/degradation foundation can state, ““Boost your child’s natural defenses against diseases! Keep your child free of infections – Vaccinate!”” Furthermore, for the liberty/oppression foundation, the message can add, ““Take personal control of your child’s health! Vaccinations help your child and others be free to live a happy and healthy life.””³³⁵

It was also found that vaccine-hesitant parents are least motivated by the care/harm foundation in their decision-making. As such, messaging that conveys using vaccinations as a means of civic responsibility will not prompt as much action as one of

³³³ Amin, Avnika B., Robert A. Bednarczyk, Cara E. Ray, Kala J. Melchiori, Jesse Graham, Jeffrey R. Huntsinger, and Saad B. Omer. "Association of moral values with vaccine hesitancy." *Nature Human Behaviour* 1, no. 12 (2017): 873-880.

³³⁴ Ibid.

³³⁵ Ibid.

purity and liberty.³³⁶ These cultural dispositions paint a stark contrast to the community-centric nature Alexis de Tocqueville once described the United States to have in 1831.³³⁷ Therefore, it is particularly through this decline in citizen fellowship that the government needs to assume a role in ensuring the sustainability of the public's health and safety.

Conclusion

One of the myriad of roles the states and federal governments have, is to ensure the public health and safety of its citizens, especially for those in vulnerable populations. As such, public health policies must be consistency examined and adapted as diseases emerge and re-emerge, and medical advances are continuously made. This is particularly relevant as the country, and the world, continue to endure the COVID-19 crisis. Prior to the pandemic, the United States was combating the worst measles outbreak it had in 25 years. These outbreaks were due to declining rates of MMR immunizations, which were in part fueled by the anti-vaccination movement and spread of disinformation, but also the lack of access and time capacity for parents.³³⁸

Therefore, the states and federal governments need to once again work together in order to create and support policies that will help achieve and maintain herd immunity for potentially deadly viruses such as the measles. These policies include the use of monetary vaccine incentive programs as seen in Australia and the establishment of a national

³³⁶ Ropeik, David. "People's Fears About Vaccines Aren't Just About Vaccines," February 4, 2019. <https://slate.com/technology/2019/02/antivax-measles-outbreak-moral-foundations-theory.html>.

³³⁷ Tocqueville, Alexis de, and Jacob Peter Mayer. Essay. In *Democracy in America*, 509–13. Garden City, NY: Doubleday, 1969.

³³⁸ Press, Associated. "Measles Cases Hit 25-Year High in US amid Anti-Vaxx Movement." The Guardian. Guardian News and Media, April 24, 2019. <https://www.theguardian.com/us-news/2019/apr/24/measles-cases-25-year-high-anti-vaxx-vaccine>; Simmons-Duffin, Selena. "The Other Reasons Kids Aren't Getting Vaccinations: Poverty And Health Care Access."

immunization database so that all states may uniformly report their administration rates. This would also complement existing government programs which provide free vaccinations to children under Medicaid or are uninsured.

However, these incentives may not address the changing landscape that is being observed due to misplaced concerns over vaccine safety. As such, it is also imperative that the federal government enact additional programs to help combat disinformation such as partnerships with medical professionals to extensively explain the safety of the measles vaccine and dangers of the virus should an individual be unprotected. In addition, partnerships with private technology companies like Facebook, Twitter, and Google should be considered in order to impede the rapid spread of disinformation shared about immunizations. Through these combined programs and initiatives, the United States would be able to help protect vulnerable populations at home and abroad.

Conclusion

Nearly 60 years ago, the measles epidemic was so widespread, it is estimated that every American contracted this disease by the age of 15.³³⁹ However, through the concerted efforts of states and federal governments, the United States was able to decrease the number of reported measles cases from 3 to 4 million per year to just 86 cases by the year 2000. The success of this initiative resulted in the declaration that this highly contagious disease was eliminated as a public health problem, thus allowing generations of Americans to be spared from its unrelenting wrath.³⁴⁰

However, over time, this public health feat became a victim of its own success. That is, as cases continued to significantly decline, states began to allow parents to cite non-medical vaccination exemptions, such as philosophical and religious objections, to circumvent school immunization requirements for students. This trend has worsened as the number of excused households has significantly increased, in step with more parents becoming vaccine-hesitant or resistant. This is due to the circulation of disinformation about the measles, mumps, and rubella (MMR) vaccine, along with other immunizations.³⁴¹ As a result, there is a significant portion of the American population that is not protected against vaccine-preventable diseases such as the measles.³⁴²

This anti-vaccination or vaccine-hesitancy trend has been observed throughout the Western Hemisphere in countries such as the United States, United Kingdom, and

³³⁹ "Measles | History of Measles | CDC." Centers for Disease Control and Prevention. February 5, 2018. <https://www.cdc.gov/measles/about/history.html>

³⁴⁰ Howard, Jacqueline. "US Measles Outbreak Is Largest since Disease Was Declared Eliminated in 2000." CNN. Cable News Network, April 25, 2019. <https://www.cnn.com/2019/04/24/health/measles-outbreak-record-us-bn/index.html>.

³⁴¹ Hussain, Azhar, Syed Ali, Madiha Ahmed, and Sheharyar Hussain. "The anti-vaccination movement: a regression in modern medicine." *Cureus* 10, no. 7 (2018).

³⁴² Magra, Iliana. "Over 20 Million Children a Year Miss Out on First Dose of Measles Vaccine," April 25, 2019. <https://www.nytimes.com/2019/04/25/world/europe/children-measles-vaccine.html>.

France.³⁴³ The declining trust in immunizations has been so alarming the World Health Organization (WHO) in 2019 deemed vaccine hesitancy to be among the top ten global health threats of the year, alongside climate change, HIV, and Ebola. As a result, outbreaks of previously eliminated vaccine-preventable diseases are on the rise again.³⁴⁴

This outcome also inevitably led to the United States to endure the largest measles outbreak in 25 years with over 1,200 confirmed cases in 2019.³⁴⁵ As the nation continues to combat the COVID-19 pandemic with over 14.6 million cases, this may seem a misplaced concern.³⁴⁶ However, according to the United Nations Children's Fund (UNICEF), over 2.5 million children in the United States, and 169 million around the world, did not receive their first dose of protection against the measles virus between 2010 and 2017. Thus, setting the foundation for ongoing rounds of deadly global outbreaks.³⁴⁷

Despite these concerning trends, only 5 states: Mississippi, West Virginia, New York, California, and Maine have removed non-medical vaccine exemptions for students seeking to attend school and to interact with other potentially immunocompromised

³⁴³ Hussain, Azhar, Syed Ali, Madiha Ahmed, and Sheharyar Hussain. "The anti-vaccination movement: a regression in modern medicine."

³⁴⁴ "Ten Health Issues WHO Will Tackle This Year." World Health Organization. 2019. <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>.

³⁴⁵ "U.S. Measles Cases in First Five Months of 2019 Surpass Total Cases per Year for Past 25 Years." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, May 30, 2019. <https://www.cdc.gov/media/releases/2019/p0530-us-measles-2019.html>.

³⁴⁶ "COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)," 2020. <https://coronavirus.jhu.edu/map.html>.

³⁴⁷ "Over 20 Million Children Worldwide Missed out on Measles Vaccine Annually in Past 8 Years, Creating a Pathway to Current Global Outbreaks - UNICEF," April 25, 2019. <https://www.unicef.org.uk/press-releases/over-20-million-children-worldwide-missed-out-on-measles-vaccine-annually-in-past-8-years-creating-a-pathway-to-current-global-outbreaks-unicef/>.

students.³⁴⁸ Other states, such as Minnesota, Arizona, Vermont, Washington, and Iowa have unsuccessfully attempted to repeal these exemptions.³⁴⁹

Findings of this Thesis

The first chapter of this body of work found the Public Health Service Act of 1944 provides the federal government with legal grounds “to prevent the introduction, transmission, or spread of communicable disease” between states and from those sourced internationally by visiting or returning travelers.³⁵⁰ Such a case was recently evident with the 2019 measles outbreak as it was driven by unvaccinated travelers returning home with this disease from countries such as Israel, Vietnam, and Thailand, and later spreading it throughout the states.³⁵¹

This study also established that some children in the United States are not being vaccinated against the measles due to poverty and the lack of access to consistent healthcare.³⁵² Although it is not known how many children are not receiving immunizations due to poverty versus those not receiving immunizations due to vaccine-hesitancy or resistance, the 1994 Vaccines for Children (VFC) program was set up to provide those under Medicaid or uninsured with free access to these life-saving

³⁴⁸ "States With Religious and Philosophical Exemptions From School Immunization Requirements." *National Conference of State Legislatures*. June 14, 2019. <http://www.ncsl.org/research/health/school-immunization-exemption-state-laws.aspx>

³⁴⁹ Sun, Lena H. "Anti-Vaxxers Face Backlash as Measles Cases Surge." *The Washington Post*. WP Company, February 26, 2019. https://www.washingtonpost.com/national/health-science/anti-vaxxers-face-backlash-as-measles-cases-surge/2019/02/25/e2e986c6-391c-11e9-a06c-3ec8ed509d15_story.html

³⁵⁰ Hughes, Richard. "Vaccine Exemptions And The Federal Government's Role." *Vaccine Exemptions And The Federal Government's Role* | Health Affairs. March 21, 2019. <https://www.healthaffairs.org/doi/10.1377/hblog20190318.382995/full/>

³⁵¹ Keating, Dan, Brittany Renee Mayes, and Tim Meko. "A Record Number of Measles Cases Is Hitting the U.S. This Year. Who Is Being Affected?" *The Washington Post*. WP Company, May 31, 2019. <https://www.washingtonpost.com/graphics/2019/health/measles-who-is-being-affected/>

³⁵² Simmons-Duffin, Selena. "The Other Reasons Kids Aren't Getting Vaccinations: Poverty And Health Care Access." *NPR*. May 20, 2019. <https://www.npr.org/sections/health-shots/2019/05/20/724468630/the-other-reasons-kids-arent-getting-vaccinations-poverty-and-health-care-access>

immunizations. However, it is significantly limited in reach as only about 44,000 doctors participate in VFC and their office may still charge for the visit.³⁵³ Therefore, limiting the ability of the program to lift financial burdens for preemptive medical care.

Moreover, the second chapter of this thesis found deadly infectious diseases, if not properly protected against, can cause grave national security threats.³⁵⁴ As such, the President would have the rationale to issue an executive order that would remove non-medical vaccination exemptions. In doing so, this would also increase funding towards programs that would preemptively protect the public from these attacks. This may include expanding the VFC program.

However, if neither Congress or the President are able to remove non-medical exemptions, an alternative measure could be for Congress to enact monetary vaccine incentive programs, where households could receive either direct payments or a tax credit for adhering to the recommended immunization schedules for vaccines that have been administered for a minimum of ten years, proven effective, and with little to no side effects. This study found that such programs would most likely aid in increasing the immunization rate of the country, as was already seen in Australia where a similar program was implemented.³⁵⁵

Policy Recommendations: Pros and Cons

³⁵³ VFC | About the Program | Vaccines for Children Program | CDC." *Centers for Disease Control and Prevention*. February 18, 2016. <https://www.cdc.gov/vaccines/programs/vfc/about/index.html>.

³⁵⁴ Peterson, Susan. "Epidemic disease and national security." *Security Studies* 12, no. 2 (2002): 43-81.

³⁵⁵ Lawrence, Glenda L., C.Raina MacIntyre, Brynley P. Hull, and Peter B. McIntyre. "Effectiveness of the Linkage of Child Care and Maternity Payments to Childhood Immunisation." *Vaccine*. Elsevier, December 12, 2003. <https://www.sciencedirect.com/science/article/pii/S0264410X03008363>.

In order to protect the American people from vaccine-preventable diseases and help maintain national security, Congress should enact legislation that sets a nationwide vaccination standard and remove all non-medical vaccine exemptions for immunizations that have been: 1) administered to the American public for a minimum of ten years; 2) proven effective; and 3) have little to no side effects. It is also recommended that, in conjunction with these legislative changes, Congress expand the capacity of the VFC program. This would build the additional infrastructure needed to facilitate the resulting increases in vaccinations. This is particularly relevant as the United States continues to suffer from the COVID-19 pandemic. This was not the first public health emergency the nation has faced, and it will not be the last.

However, this process is complex and not easily achieved. For instance, Representative Frederica Wilson of Florida introduced the Vaccinate All Children Act of 2019, which would amend the Public Health Service Act of 1944 and require every public elementary and secondary school student in the United States to be vaccinated in accordance with the recommendations from the Advisory Committee on Immunization Practices. Nonetheless, there has been no action on this bill despite having 18 co-sponsors and it is still waiting for a vote in the House of Representatives.³⁵⁶

In 2015, in response to the rising number of confirmed measles cases in the country, then-House Minority Leader Nancy Pelosi said, “she was sympathetic to parents’ concerns, but that maintaining public health required that all children receive the

³⁵⁶ United States, Congress, “Vaccinate All Children Act of 2019.”

necessary shots.”³⁵⁷ However, it is unknown why the Vaccinate All Children Act of 2019 has not been acted upon.

It may be due to the varying priorities presented in the House or the potential unpopularity of the law as parents across the country have become increasingly vaccine-hesitant and resistant. In 2019, Harvard T.H. Chan School of Public Health and research firm SSRS found that 84 percent of parents support childhood vaccine requirements. However, it was also found that only 54 percent of adults believe childhood immunizations such as the MMR vaccine are “very safe” and only 37 percent of adults note their trust in public health agencies on vaccine safety as “a great deal.”³⁵⁸ Furthermore, a number of anti-vaccination groups have found it their civil right to refuse vaccines, despite the Supreme Court ruling otherwise in *Jacobson v. Massachusetts* (1905).³⁵⁹

If Congress lacks the necessary political will to create and pass such legislation, then the President of the United States could issue an executive order removing all non-medical vaccine exemptions. Neither President Donald Trump nor President-elect Joseph Biden have expressed support for compulsory vaccine laws. Vice President Biden has stated that he would consider making the impending COVID-19 vaccine a school admission requirement, similar to the measles vaccine. However, this would be

³⁵⁷ Reuters. “Nancy Pelosi, John Boehner Weigh In On Vaccinations.” HuffPost, February 3, 2015. https://www.huffpost.com/entry/nancy-pelosi-vaccinations_n_6604936.

³⁵⁸ Sweeney, Chris. “Poll Finds Public Support for School-Based Vaccination, but Limited Trust in Vaccine Safety and Public Health Agencies.” Harvard T.H. Chan School of Public Health, September 12, 2019. <https://www.hsph.harvard.edu/news/press-releases/poll-finds-public-support-for-school-based-vaccination-but-limited-trust-in-vaccine-safety-and-public-health-agencies/>.

³⁵⁹ Donovan, Doug. “Vaccine Opponents Unite around a 'Civil Liberties' Argument on Social Media, Study Finds.” The Hub. Johns Hopkins University, October 2, 2020. <https://hub.jhu.edu/2020/10/02/anti-vaccine-movement-unites-around-civil-liberties-argument/>; *Jacobson v. Massachusetts*, 197 U.S. 11, 25 S. Ct. 358, 49 L. Ed. 643 (1905).

maintained by state officials.³⁶⁰ Conversely, President Trump has previously questioned vaccine safety and even shared vaccine disinformation, but in light of the 2019 measles outbreak reaching a historic pinnacle, he encouraged the American public to get vaccinated and noted its importance.³⁶¹

However, the use of an executive order in this context could have adverse implications. For instance, it would be concerning if a President were to favor the militarization of vaccine distribution or the armed service management of public health outbreaks. This could be made possible through the Insurrection Acts which states,

“Whenever the President considers that unlawful obstructions, combinations, or assemblages, or rebellion against the authority of the United States, make it impracticable to enforce the laws of the United States in any State by the ordinary course of judicial proceedings, he may call into Federal service such of the militia of any State, and use such of the armed forces, as he considers necessary to enforce those laws or to suppress the rebellion.”³⁶²

In this case, military-enforced quarantines could be imposed. This would inevitably cause increased conflict as civil agencies, such as the Centers for Disease Control and Prevention (CDC) and the Department of Health & Human Services (HHS), already have legal grounds to mandate quarantines through the Public Health Service Act.³⁶³ This also raises medical privacy concerns as the military could potentially gain unlimited access, without consent, to citizen medical records.

³⁶⁰ Sadeghi, McKenzie, and Miriam Fauzia. “Fact Check: Neither Biden nor Trump Is Calling for Mandated COVID-19 Vaccines.” USA Today. Gannett Satellite Information Network, October 27, 2020. <https://www.usatoday.com/story/news/factcheck/2020/10/27/fact-check-neither-biden-nor-trump-call-covid-19-vaccine-mandate/6033139002/>.

³⁶¹ LaVito, Angelica. “Trump Says People Must Get Vaccinated amid Historic Year for Measles Cases.” CNBC. CNBC, April 26, 2019. <https://www.cnbc.com/2019/04/26/trump-says-people-must-get-vaccinated-amid-measles-outbreaks.html>.

³⁶² Dunlap, Charlie. “Why Militarizing the Coronavirus Response Is a Bad Idea...for Now Anyway.” Lawfire. Duke University, March 19, 2020. <https://sites.duke.edu/lawfire/2020/03/19/why-militarizing-the-coronavirus-response-is-a-bad-idea-for-now-anyway/>.

³⁶³ Ibid; Hughes, Richard. “Vaccine Exemptions And The Federal Government's Role.”

Further, employing the use of military force against a nation's own people could give rise to abuse of power and cultivate unfavorable political and moral views. In July 2020, for instance, the world witnessed how the United States Department of Homeland Security, Marshals Service, and Customs and Border Protection were deployed against its own citizens. They used tear gas and unmarked vans to terrorize protesters exercising their First Amendment right.³⁶⁴ While it is understood the removal of non-medical vaccine exemptions may not be favorable policy for those with religious objections or to victims of disinformation, the right to protest without intimidation, for any issue, must be protected.

Given the potential unfavorable impact this type of executive order could have, this study does not recommend that a President mandate the removal all non-medical vaccine exemptions. Although this public health executive order would save lives, it should be done through the branch of government that is most closest to the people. That is, Congress.

In the event neither Congress or the President are able to find a resolution, this study recommends alternative measures such as enacting monetary vaccine incentive programs to increase vaccine coverage. A similar program was first implemented in Australia in 1997. At the time, it's vaccine coverage rate was 75 percent.³⁶⁵ However, at least 95 percent of the population must be vaccinated to achieve herd immunity.³⁶⁶ Through this program, parents were given direct payments of AU\$750 upon birth and an

³⁶⁴ Shepherd, Katie, and Mark Berman. "It Was like Being Preyed upon': Portland Protesters Say Federal Officers in Unmarked Vans Are Detaining Them." The Washington Post. WP Company, July 17, 2020. <https://www.washingtonpost.com/nation/2020/07/17/portland-protests-federal-arrests/>.

³⁶⁵ Lawrence, Glenda L., C.Raina MacIntyre, Brynley P. Hull, and Peter B. McIntyre. "Effectiveness of the Linkage of Child Care and Maternity Payments to Childhood Immunisation."

³⁶⁶ "Vaccination Greatly Reduces Disease, Disability, Death and Inequity Worldwide." World Health Organization. March 04, 2011. <https://www.who.int/bulletin/volumes/86/2/07-040089/en/>.

additional AU\$200 once a child received all scheduled vaccinations prior to reaching the age of 18-months. As a result, the Australian vaccination rate went from 75 percent in 1997 to 94 percent by 2001.³⁶⁷

If the United States were to implement a similar program, the nation's vaccine coverage rates could also significantly increase. This may be especially true for households that have limited-time and financial capacity, where preemptive medical visits may not have been as high of a priority.

However, each state maintains its own platform that holds the immunization records for school entry and follow-up purposes. These various individualized databases are unable to communicate with each other and reconcile information at a national level.³⁶⁸ As such, the federal government would need to create and maintain a national database, facilitated by the CDC or HHS, so that the program can run as efficiently as possible.

The decentralization of immunization records also highlights the fact that the nation's reported vaccine coverage may not be as accurate. However, in creating a centralized system, the federal government will not only have access to the information necessary to prove the administration of immunizations, but the ability to monitor and assess if herd immunity rates for vaccine-preventable diseases are being maintained or compromised would be possible.

While the probability of Congress enacting legislation that would repeal non-medical vaccination exemptions does not seem likely to occur in the near future and the

³⁶⁷ Lawrence, Glenda L., C.Raina MacIntyre, Brynley P. Hull, and Peter B. McIntyre. "Effectiveness of the Linkage of Child Care and Maternity Payments to Childhood Immunisation."

³⁶⁸ Scutti, Susan. "How Countries around the World Try to Encourage Vaccination." CNN. Cable News Network, January 2, 2018. <https://www.cnn.com/2017/06/06/health/vaccine-uptake-incentives/index.html>.

use of executive orders is not recommended, the incentive program could be a reasonable alternative, and can garner a consensus to help increase herd immunity. However, this will not help restore trust of immunizations to vaccine-hesitant and resistant communities.

Re-establishing trust in immunizations has become a dire worldwide issue in the midst of the COVID-19 pandemic as the solution largely rests with the discovery and mass distribution of an safe and effective vaccine. However, its discovery has become more of a global competition rather than a collaborative effort that is normally observed within the scientific community. Every country has the strategic desire to be first to develop this vaccine as it will “give the winner the chance to favor its own population and potentially gain the upper hand in dealing with the economic and geostrategic fallout from the crisis.” This includes monopolizing patents, the income generated from the vaccine, and securing national safety against terror threats and not being “beholden to a foreign power for access to the drugs that are needed in a crisis.”³⁶⁹

Three months into the pandemic, pharmaceutical companies already began clinical trials to test experimental vaccines on members of the public.³⁷⁰ Further, in March 2019, President Trump tweeted that “The changes have been made and testing will soon happen on a very large scale basis. All Red Tape has been cut, ready to go!”³⁷¹ However, these regulations in vaccine production and testing were set by the Food and Drug Administration (FDA) and CDC for a reason.

³⁶⁹ Sanger, David E., David D. Kirkpatrick, Sui-Lee Wee, and Katrin Bennhold. “Search for Coronavirus Vaccine Becomes a Global Competition.” *The New York Times*. The New York Times, March 19, 2020. <https://www.nytimes.com/2020/03/19/us/politics/coronavirus-vaccine-competition.html>.

³⁷⁰ *Ibid.*

³⁷¹ “Trump: Coronavirus Testing Will Soon Happen on 'Large Scale', 'Red Tape' Cut.” *Reuters*. Thomson Reuters, March 13, 2020. <https://www.reuters.com/article/us-health-coronavirus-usa-trump/trump-coronavirus-testing-will-soon-happen-on-large-scale-red-tape-cut-idUSKBN2101FI>.

Yet, as a political entity that is ultimately run by the Executive Office, on August 23, 2020, the FDA gave an emergency approval to use the blood plasma from COVID-19 survivors on currently hospitalized patients.³⁷² This announcement was set to be made earlier in the month. However, it was put on hold as the “data to date was not strong enough to warrant an emergency approval.”³⁷³ Nonetheless, the FDA announced the emergency approval the day before the Republican National Convention, which allowed President Trump the ability to notify the nation on this progression.³⁷⁴

The continued politicization of the impending COVID-19 vaccine along with propelling FDA regulations, can only further aggravate distrust in vaccines and discredit the work already occurring by medical professionals and religious leaders to convince members of vaccine-hesitant and resistant groups to trust them.³⁷⁵ To that end, it is imperative and recommended that multiple international organizations and leaders of the scientific community act as third party evaluators on the safety and effectiveness of the novel COVID-19 vaccine. This includes seeking an endorsement from the WHO.

The public must also be weary of the fact that the WHO is still a political organization. However, it does not carry any legal authority and relies upon the information voluntarily shared by countries to make its analysis. This includes the initial information received about the coronavirus from the Chinese government as well as any

³⁷² Lafraniere, Sharon, Sheri Fink, Katie Thomas, and Maggie Haberman. “F.D.A. Allows Expanded Use of Plasma to Treat Coronavirus Patients.” The New York Times. The New York Times, August 23, 2020. <https://www.nytimes.com/2020/08/23/us/politics/fda-plasma-coronavirus.html>.

³⁷³ Weiland, Noah, Sharon Lafraniere, and Sheri Fink. “F.D.A.’s Emergency Approval of Blood Plasma Is Now on Hold.” The New York Times. The New York Times, August 19, 2020. <https://www.nytimes.com/2020/08/19/us/politics/blood-plasma-covid-19.html>.

³⁷⁴ Lafraniere, Sharon, Sheri Fink, Katie Thomas, and Maggie Haberman. “F.D.A. Allows Expanded Use of Plasma to Treat Coronavirus Patients.”

³⁷⁵ Dias, Elizabeth. “Measles Outbreak: What Are Religious Exemptions for Vaccinations?” The New York Times. The New York Times, March 27, 2019. <https://www.nytimes.com/2019/03/27/us/measles-vaccine-exemptions.html>.

potentially-shared data about eligible vaccines. Since information is based on an honor system and must be freely given, the WHO is faced with having to balance its duty as an international public health organization with appeasing its donor member countries, such as the United States and China, to maintain its ability to receive and analyze information.³⁷⁶ Therefore, an additional area for future scholarship would be how to reform the WHO and increase its legal authority so that it may prevent the rise and proliferation of new and re-emerging infectious diseases.

The measles is one of the most contagious diseases in the world. In 2018, it took the lives of over 140,000 people, a majority of which were children less than 5 years old.³⁷⁷ Yet, humanity's only defense against this virus was invented nearly 60 years ago in the form of a pre-emptive vaccine.³⁷⁸ However, due to the rise in vaccine-hesitancy and resistance, along with inequitable access to healthcare services, over 1,200 Americans unnecessarily suffered from the measles.³⁷⁹ In 1905, the Supreme Court reaffirmed the duty of the states to protect the health and safety of its residents, but as cases reached its highest levels in 25 years, only 5 states have upheld their end of the social contract.³⁸⁰ Thus, as the people's branch, Congress has the ability to maintain the security of the

³⁷⁶ Gilsinan, Kathy. "How China Deceived the WHO." *The Atlantic*. Atlantic Media Company, April 12, 2020. <https://www.theatlantic.com/politics/archive/2020/04/world-health-organization-blame-pandemic-coronavirus/609820/>.

³⁷⁷ "Measles." World Health Organization. May 9, 2019. <https://www.who.int/news-room/fact-sheets/detail/measles>.

³⁷⁸ "Measles | History of Measles | CDC." Centers for Disease Control and Prevention.

³⁷⁹ Sreenivasan, Hari, and Courtney Norris. "How Vaccine Hesitancy Is Contributing to Deadly Measles Resurgence." PBS. Public Broadcasting Service, February 13, 2020. <https://www.pbs.org/newshour/show/how-vaccine-hesitancy-is-contributing-to-deadly-measles-resurgence>; Simmons-Duffin, Selena. "The Other Reasons Kids Aren't Getting Vaccinations: Poverty And Health Care Access."

³⁸⁰ *Jacobson v. Massachusetts*, 197 U.S. 11, 25 S. Ct. 358, 49 L. Ed. 643 (1905); Cai, Weiyi, Denise Lu, and Scott Reinhard. "Largest U.S. Measles Outbreak in 25 Years Surpasses 800 Cases." *The New York Times*. April 30, 2019. <https://www.nytimes.com/interactive/2019/health/measles-outbreak.html>; Blint-Welsh, Tyler. "New York Ends Religious Exemptions for School Vaccinations." *The Wall Street Journal*. June 13, 2019. <https://www.wsj.com/articles/new-york-ends-religious-exemptions-for-school-vaccinations-11560467427?ns=prod/accounts-wsj>

nation by removing non-medical vaccination exemptions or creating monetary immunization incentives that will empower the American people to protect themselves and those around around them against deadly viruses such as the measles, as diseases do not recongize state or country borders.

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Curriculum Vita

Catherine Nicole Garces was born on December 24, 1996 in Long Island, New York. Upon graduating Mount Holyoke College in 2018 with Bachelor of Arts degree in Biology and Political Science, she moved to New York City to work at the global health non-profit. A year later, she began the Advanced Academic Programs at Johns Hopkins University. In December 2020, she will have earned her Masters of Arts degree in Government from the Krieger School of Arts and Sciences, with a concentration in Democracy Studies and Governance.